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This report describes the evaluation of quality circle programs in the Department of Defense (DoD). Rather than attempting to provide a final analysis of the value of quality circle programs to the DoD, this report describes the conditions and approaches necessary for a successful quality circle program. As such, this report should be used as a guide for future decisions concerning quality circle programs rather than as the final word on their utility to DoD. Keywords:

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An Evaluation of Quality Circles in Department of Defense Organizations

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FOREWORD

At the request of the Office of the Assistant Secretary of Defense (Defense Productivity Program Office), the Navy Personnel Research and Development Center evaluated quality circle programs in the Department of Defense. Organizations assessed included the Departments of the Navy, Air Force, and Army, the Defense Logistics Agency, the Defense Mapping Agency, and the Defense Investigative Service.

Rather than attempting to provide a final analysis of the value of quality circle programs to the Department of Defense, this report describes the conditions and approaches necessary for a successful quality circle program. As such, this report should be used as a guide for future decisions concerning quality circle programs rather than as the final word on their utility to DoD.

The authors wish to acknowledge all of the department productivity principals, the quality circle coordinators, facilitators, and others involved directly in the effort and members of management who assisted us. Without their help and information, we could not have conducted the study.

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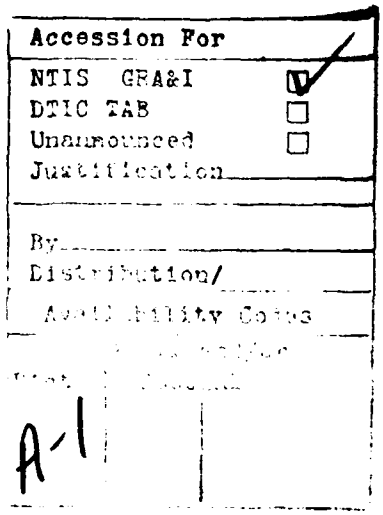

SUMMARY

Problem and Purpose

Quality circles, or worker-level problem-solving teams, began to appear in Department of Defense organizations in the late 1970s. The use of these problem-solving teams expanded rapidly and by 1984 there were reported to be over 2,000 quality circles in the Defense Department. While there are many quality circle programs today, there has been no widespread evaluation of this approach to organizational improvement. The Navy Personnel Research and Development Center was contacted by the Department of Defense Productivity Program Office and asked to conduct such an evaluation. The purpose of this report is to describe the results of that work.

A quality circle is a small group of volunteer workers, usually 5 to 10, from the same work area who meet regularly on company time to identify and analyze work-related problems and recommend solutions to management. Although it has been estimated that from one-half to two-thirds of all quality circles fail, results reported in the literature tend to be inconsistent. While there may be reason to question some of the claimed benefits of quality circle programs, it may be premature to conclude that they cannot work as well in the United States as they have in other countries, such as Japan. A more appropriate question to explore at this time should concern the circumstances under which they can work well. The present study, therefore, addresses those conditions under which quality circles work best in public sector organizations.

Approach

Questionnaire responses from 494 circles operating in 47 Department of Defense organizations formed the data base. In addition, interview information from quality circle program coordinators and agency productivity principals was included.

The success of quality circles was judged on the basis of two criteria: the first was the percentage of solutions implemented and the second was the degree of goal achievement reported in terms of quality improvement and increased productivity. Questionnaires were designed to evaluate several hypotheses regarding necessary and sufficient conditions for quality circle program success. The following variables were investigated:

1. Reasons for joining quality circles;
2. Management's interest in worker participation;
3. Ability to solve problems at the shop level;
4. Amount of organizational trust and stability;
5. The adequacy of management training;
6. Degree of democratic quality circle group interaction;
7. Regularity of quality circle meetings;
8. Adequacy of information for solving problems;
9. Generation of solutions consistent with the goals of the organization;
10. The degree to which management is concerned with infringement of power;
11. Adequacy of recognition and rewards;
12. The amount of turnover of quality circle personnel;
13. The degree to which cost savings can be demonstrated;
14. The degree to which the quality circle program is integrated into the organizational structure; and
15. The age of the circle.

The questionnaires and interview information were used to determine the extent to which these variables were related to successful quality circles.

Findings of the Research

Table 1 shows whether there was a relationship between the hypothesized variables and the percentage of solutions implemented and reported levels of goal achievement.

Table 1

Relationship of Hypotheses to Percentage of Solutions Implemented and Reported Levels of Goal Achievement

Hypothesis	Solutions Implemented	Goals Achieved
1. Workers want to participate	-	*
2. Management interested in worker participation	*	*
3. Problems at shop level	-	*
4. Organizational trust and stability	*	*
5. Degree of management training	*	-
6. Democratic group interactions	-	*
7. Regular QC meetings	-	*
8. Sufficient information	-	*
9. QC solutions consonant with organizational goals	*	*
10. Management concern with infringement of power	*	*
11. Monetary rewards	-	*
12. Turnover of QC personnel	*	*
13. Cost savings shown	*	*
14. QC program integrated	*	*
15. Age of circle	*	-

Note. An * represents a statistically significant correlation ($p < .05$).

The hypotheses having the strongest relationship with an increased percentage of suggestions implemented were hypotheses 13 and 14. It appears that if quality circles are to implement solutions, a structure or process must exist for that implementation. Second, mere collection of cost/benefit data improves the likelihood of solution implementation, as well as indicates proven savings resulting from quality circle suggestions.

It appears that even though the quality circles operate in accordance with accepted procedures, meet regularly, are run democratically, and generally follow guidelines set forth in training, the program as a whole may not be effective at changing the organization. Support by management is necessary for solutions to be implemented. In fact, making presentations to management may be the only influence circles have over solution implementation, and it should be noted that quality circle members report receiving virtually no training in this important activity.

For quality circles to be successful, management must support quality circle suggestion implementation and do its best to shield quality circles from conditions that hamper success. This study suggests that the way quality circles are implemented and administered is critical. Potential problems that arise during implementation of quality circle programs include unrealistic expectations, nonsupport or resistance from supervisors and managers, loss of key quality circle personnel, lack of recognition for quality circle participation, and disruption of the work.

While several hypotheses were strongly associated with the percent of suggestions implemented, there was consistent and strong association of the hypothesized variables with the achievement of goals. Quality circle members reported that their activity not only led to practical outcomes for the shop (e.g., improved productivity) but also resulted in less tangible benefits, such as improved superior-subordinate trust and increased credibility with management. While it would be difficult to place a dollar value on these outcomes, they must be considered important advances for the organization as a whole and the individuals who belong to it.

Conclusions

1. Before implementation of a quality circle program, an assessment of the degree to which management is interested in worker participation should be performed. Action can then be taken to minimize any problem in this regard before implementation.

2. Management should establish clear objectives and goals concerning the types of problems on which their quality circles should work.

3. Management should develop a formal policy specifying individual management responsibilities for quality circle suggestion implementation. The formation of a steering group could be part of that policy.

4. Supervisors and managers should receive training as to the purpose of and their responsibilities to the organization's quality circle program. Recognition of managers who implement suggestions is also recommended as a way to promote greater interest in the program.

5. While quality circle members seem to receive adequate training for problem solving and solution development, they receive little training in how to make management presentations. Since management presentations seem to be the only form of recognition received by quality circles, they should be given the greatest opportunity to succeed. Other forms of recognition should also be established.

6. Cost/benefit data should be systematically collected for all quality circle suggestions. Members should be trained to perform these analyses as part of the regular quality circle process, with cost/benefit data passed on to the program coordinator. This step will be advantageous to organizations with quality circle programs or to those wishing to start such programs for three important reasons: First, collection of cost/benefit data as a standard part of the solution implementation process promotes solution implementation and continued member interest. Second, costs of training and maintaining quality circles will be difficult to justify in an audit if organizations have not collected information on costs and benefits. Third, provision of cost/benefit information will reduce the burden on management staff to perform these analyses.

CONTENTS

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INTRODUCTION

Problem and Purpose

Policy-makers and managers continue to be concerned about the declining rate of productivity growth in the United States. This concern has led to the development of various programs designed to improve productivity, product quality, and employee attitudes. One such program involves quality control circles. A quality circle is a small group of workers, usually 5 to 10, from the same work area who meet voluntarily on a regular basis to identify and analyze work-related problems and to recommend solutions to management.

Recognizing the potential for productivity improvement, public sector organizations increased the number of quality circles from 2 in 1979 to over 1,500 by the end of 1980 (Crawford, 1983). The cost of these early programs was estimated to be in excess of 5 million dollars (Crawford, 1983). Currently, there are over 2,500 quality circles in the Federal Government (Ben-Ami, 1985) with over 2,000 of them in the Department of Defense (DoD). However, as early as January 1981, the General Accounting Office (Krieger, 1981) and organizational researchers observed that the costs and benefits of most programs were not well documented, nor the programs thoroughly evaluated.

Although it has been estimated that from one-half to two-thirds of all quality circles will fail (Aubler & Overholt, 1982; Imberman, 1982), results of evaluations tend to be very mixed (Atwater & Sander, 1984; Steel, Mento, Dilla, Ovalle, & Lloyd, 1985). While Steel and Shane (1986) point out that there is reason to question the claimed benefits of quality circle programs, it may be premature to conclude that they cannot work as well in the United States as they have in other countries, such as Japan.

Rather than assuming that quality circles are either effective or ineffective, it makes sense to look instead at the circumstances under which they will work well. The present study by the Navy Personnel Research and Development Center examines quality circles in DoD organizations from that perspective.

Background

Quality circles generally recommend solutions for quality and productivity problems which management then may implement. Quality circle members receive training in problem solving, statistical quality control, and group process. A facilitator, usually a member of management with special training, helps train circle members and ensures that things run smoothly. Typical objectives of quality circle programs include quality improvement, productivity enhancement, and employee involvement. Circles generally meet 4 hours a month, usually one hour a week, on company time. Members may receive recognition but rarely financial rewards. Participation is most often voluntary and quality circle members are strongly advised to be specific in their goals.

Four groups of individuals support quality circle programs:

a. Steering Committee--The steering committee is an important management-level group that provides overall guidance and direction for quality circle activities. It prepares the quality circle implementation plan and establishes program guidelines. It usually recommends training for managers so that they may learn about their duties and responsibilities to the program.

b. Program coordinator or facilitator--The facilitator is responsible for designing the training materials, conducting orientation seminars for management, initiating interest among supervisors, and training circle leaders and members. Once circles start, the facilitator (or coordinator) aids circle leaders by coaching them, maintaining records for them, and securing the technical assistance requested by the circle. At a minimum, facilitators need to have training in the quality circle process, decision making, group dynamics, committee leadership, and consulting skills. A facilitator can handle approximately 10 circles.

c. Circle leader--The supervisor of the work group becomes the circle leader and is trained to work as a group member and not as a "boss." Circle leaders go through training in leadership skills, techniques to enhance adult learning, and in motivation and communication techniques.

d. Circle members--These volunteers for membership are trained in data-gathering techniques, in various measurement techniques including Pareto analysis, fishbone or cause-and-effect diagrams, and in decision-making techniques such as brainstorming. This training enables workers to attack problems systematically through gathering and analyzing data.

Quality circles, as generally understood, have dual purposes. One set of goals deals with increased productivity and quality improvement. The problems explored by quality circles are often those that prevent workers from doing their assigned work to capacity. The goals of some typical efforts include reducing defects, scrap, rework, or downtime. These activities, in turn, are expected to lead to cost reduction, increased productivity, and higher product quality.

The second set of goals deals with employee involvement. It is assumed that the workers themselves know more about their problems than anyone else; therefore, they are the best qualified to find the solutions. It is also assumed that involving people directly in decisions will increase their feelings of accomplishment, pride, self-esteem, and self-fulfillment. With such feelings comes a higher level of commitment to the job and to the organization. At the same time, the circles focus on improving working conditions and the self-development of workers. The latter includes: development of leadership abilities of workers, skill development among workers, improvement of worker morale and motivation, the stimulation of teamwork within the work groups, and recognition of worker achievements. Above all, the circles represent recognition of workers as important contributors to the organization.

Support from top and middle management is important to the success of a quality circle program (Deming, 1981-82). Management support is demonstrated in a number of ways: by allowing members to attend meetings, by providing them with needed resources, by publicizing the process, by listening to and implementing circle suggestions, by attending quality circle presentations or, where appropriate, circle meetings, by allowing workers time to collect data, by not pulling circle leaders and coordinators away for other assignments, and by requiring management to attend training.

Many variables contribute to quality circle success. Sashkin (1984) maintains that the effectiveness of participative management programs depends on a great many of the contextual variables in an organization, such as the meaningfulness of the task and the degree of control over work and behavior. Wood, Hull, and Azumi (1983) speculate that

two conditions are necessary for the successful implementation of a quality circle program. The first is that the employees believe that their support and participation will benefit themselves as well as the organization. The second condition is that participants are well trained in group dynamics and problem-solving methods that are a part of the quality circle technology.

The authors have organized the thinking about quality circle effectiveness in terms of hypotheses. Fifteen hypotheses are presented below that address the effects of several variables on quality circle programs. Each hypothetical statement is followed by background information and reference to significant publications.

HYPOTHESES CONCERNING THE EFFECTIVENESS OF QUALITY CIRCLE PROGRAMS

Hypothesis 1: The more that quality circle members want to participate, the more effective the quality circle program will be.

One of the most basic assumptions in the quality circle literature is that workers want to participate in the process. Dean (1985) developed a participation model for predicting quality circle membership. He found that people who desire greater involvement in an organization and people who believe that quality circles will be instrumental in making improvements were more likely than others to join. However, several researchers indicate that the desire to participate may well be contingent on the nature of the job (Locke & Schweiger, 1979), the needs of the individuals (Hackman & Oldham, 1980; Miner, 1980), and their backgrounds (Brockner & Hess, 1986; Hulin & Blood, 1968). Others point out that for varying reasons workers simply may not want to be involved in participative decision-making programs (Ferris & Wagner, 1985; Kanter, 1983; Sashkin, 1984). Therefore, the degree to which the work force desires to participate should be determined before implementing a quality circle program.

Hypothesis 2: The higher the level of management support, the more effective the quality circle program will be.

A question related to the one above concerns the extent to which management is interested in the involvement of the work force in decision making. Vroom and Yetton (1973) present a number of situations in which employee participation should and, conversely, should not be sought by management. Further, while worker participation may be a good idea for management in many situations, quality circles cannot expect to thrive or even survive in an organization whose culture rejects the idea of worker participation (Blair & Whitehead, 1984; Werther, 1986). Brooke (1986) points out that long-term success or failure of quality circles depends on the philosophy of the organization. In short, does management philosophy support, in theory and practice, employee involvement?

Further, willingness of management to provide quality circles with time to meet and with all the necessary personnel and training is integral to a successful quality circle program (White & Bednar, 1984-85). Generally, the emphasis on management support for the quality circle program cannot be overstated (Kanter, 1983; Sashkin, 1984). Imberman (1982) cites management indifference to employee decision making as one important predictor of quality circle failure.

Hypothesis 3: The more the organization's problems are able to be solved at the work group level, the more effective the quality circle program will be.

There seems to be some question as to whether the work force is capable of solving or more capable of solving the organization's problems than managers (Ferris & Wagner, 1985). The extent to which the organization's problems are at the level of the work force must first be assessed. The assumption that quality circles can be effective anywhere must be questioned (Metz, 1984), and the implementation of quality circles must be based, at least in part, on an organizational analysis determining how quality circles will be permitted to solve the organization's problems (Steel & Shane, 1986).

Hypothesis 4: The greater the degree of organizational trust and stability and the greater the support from the union, the more effective the quality circle program will be.

The stability and predictability of the organizational environment seem to be critical factors in the success of quality circles. When management turnover is high, economic conditions difficult, or employee layoffs imminent, starting a new program not directly related to the performance of the employee's job will be difficult. Further, when there is a low degree of trust between management and the work force, successful implementation of a participative decision-making program will be unlikely (Ferris & Wagner, 1985; Kanter, 1983).

Although unions are gradually coming to support various modes of worker involvement in planning, problem solving, and decision making, there is still concern among union leaders about the possibility of union power being reduced as workers begin to identify with management (Kanter, 1983).

Hypothesis 5: The more that management is trained in responsibilities associated with the quality program, the more effective the quality circle program will be.

It is generally assumed that to be effective at problem solving, quality circle members need to be adequately trained in the statistical procedures developed by Deming (1944) and the group problem-solving techniques developed by Juran (1962). This is usually not considered a problem associated with quality circles. While quality circles appear to receive adequate initial training, the extent to which the group follows that training also seems to be a critical factor in the circle's success. However, training of managers concerning the purpose of quality circles and their roles as managers does seem to be a serious problem (Bell & Kerr, 1987).

Hypothesis 6: The more democratic the organization when setting up the quality circle program, the more effective the quality circle program will be.

The extent to which quality circles are genuinely participative has been emphasized by many authors (Kanter, 1983). If members are forced into quality circles, or are treated as if quality circles are a "luxury" that management is tolerating, then the overall effectiveness of quality circles once implemented will be limited. Similarly, if there is a lack of participation in the quality circle itself (e.g., if the supervisor controls all interaction or if the group is controlled by one member or facilitator), the overall effectiveness of the group will be limited (Meyer & Scott, 1985).

Hypothesis 7: The more frequent the quality circle meetings, the more effective the quality circle program will be.

Regular meetings are necessary if the group is to solve problems (Meyer & Scott, 1985). Meetings twice a month are recommended (Mohrman & Ledford, 1985). Work that

precludes regular meetings will seriously limit the effectiveness of quality circles (Seelye & Sween, 1982; White & Bednar, 1984-85).

Hypothesis 8: The more that quality circle members perceive that they have sufficient information to work on problems outside of their own work areas, the more effective the quality circle program will be.

While it is often recommended that quality circles work only on problems that exist at their own work group level (Lawler & Mohrman, 1985; Munchus, 1983), others argue that many quality or productivity problems may involve more than a single work group (Blair & Whitehead, 1984; Meyer & Scott, 1985). Under this circumstance, if quality circles are to be effective, they must have the additional information and support needed to solve problems that go beyond their immediate concern or boundary (White & Bednar, 1984-85).

Hypothesis 9: The greater the extent to which quality circle goals are consistent with management goals, the more effective the quality circle program will be.

If the solutions recommended are not consonant with management goals, then it is likely that management will be less than enthusiastic about their implementation (Meyer & Scott, 1985). With limited implementation goes limited effectiveness of the quality circle program (Lawler & Mohrman, 1985). Relevant managers need to be involved in the quality circle process to ensure an effective program.

Hypothesis 10: The less that management is concerned about infringement of its power, the more effective the quality circle program will be.

Management sometimes views quality circles as an infringement of its authority (Bean, Ordowich, & Westley, 1985-86; Lawler & Mohrman, 1985). Klein (1986) suggests that labeling programs "employee involvement" heightens the impression that they focus only on the improvement of the employee's work life. Since management is the instrument through which circle recommendations are implemented, perception by management that circles are threatening may result in fewer solutions being implemented. Kanter (1983) points out that delegating responsibility to other people does not mean abdicating managerial responsibilities for monitoring and supporting the process.

Hypothesis 11: Quality circles whose members receive monetary payments for their suggestions will be more effective than those whose members receive no such payments.

As quality circles evolve and solve more work-related problems, there may be a tendency for them to feel "used" by management (Lawler & Mohrman, 1985). It has been argued that quality circle members need monetary compensation in addition to the intangible benefits of being members in order for motivation to remain high (Cole & Tachiki, 1984; Klein, 1986; Ross & Ross, 1986). Kanter (1983) points out that once participation goes beyond the early experimental stage, compensation and recognition have to be more formal. Workers who participate in productivity improvement projects need to feel, eventually, that they as well as the organization benefit. Therefore, after a certain period in the program, if monetary incentives or other tangible rewards are not provided to the members, quality circle membership will decline, the size of the quality circle program will decline, and the overall effectiveness of quality circles will probably decline. Several authorities suggest that, for maximum effectiveness, at least some part of the savings should be returned to the workers as soon after their suggestions are

accepted. Blair and Whitehead (1984) suggest that the long-term viability of quality circles might depend on sharing the monetary benefits of productivity improvements. Retaining a suggestion system that rewards employees on an individual basis can undermine the quality circle program and create tensions whether or not such a program includes financial incentives (Lawler, 1971).

Hypothesis 12: The lower the turnover in management and/or quality circle personnel, the more effective the quality circle program will be.

Retaining key management personnel is recognized as one of the most important components of quality circle success (Berger, 1986; Meyer & Scott, 1985). If key supporters of quality circles are transferred to other duties or leave the organization, the viability of the quality circle program has to be considered in jeopardy. If a key circle leader is transferred, that move may stunt the growth of a circle for a while. The transfer of a key top manager may kill circles dead on the spot. Conversely, if new managers who support quality circles enter key positions which historically have supported them, the past success of the program may be maintained or renewed.

Hypothesis 13: The more that quality circles are able to demonstrate cost-effectiveness, the more effective the quality circle program will be.

While cost/benefit analyses of quality circle implementation may run counter to quality circle philosophy, most organizational researchers agree that because of management's interest in hard, tangible benefits that the quality circle program may be ultimately placed in jeopardy if it cannot demonstrate dollar savings (Cole, 1985; Gerber, 1986; Kushell, 1986; Locke & Schweiger, 1979; Seeyle & Sween, 1982; Werther, 1986). This might be especially so in organizations with large quality circle programs. When social innovations threaten basic values concerning the distribution of power, managers often demand careful measurement and bottom-line results. Therefore, a program may be supported by management only to the extent to which quality circles are able to demonstrate tangible dollar benefits. Without these results, management support will probably wane and the overall size and effectiveness of the quality circle program decline.

Hypothesis 14: The more that quality circles are integrated into the structure of the organization, the more effective the quality circle program will be.

It has been argued that for quality circle programs to remain active over the long term, they must be integrated into the existing organization (Blair & Whitehead, 1984; Cole & Tachiki, 1984; Mohrman & Ledford, 1985; White & Bednar, 1984-85). If a part of the existing structure, quality circle programs will be less susceptible to destruction from turnover in key personnel or management whim. The longer the quality circle program continues to exist without being integrated into the organization's structure, the more likely it will succumb to a fatal event. If the quality circle program is not a part of the structure of the organization, success will continue only so long as key supporters remain in place. In the long run, this is unlikely.

Hypothesis 15: The older a quality circle, the lower will be its effectiveness.

Many researchers have hypothesized a finite life span for quality circles, thought to be somewhere between 18 months and 2 years. One of the reasons offered for this short life is the likely resolution of all problems existing at the work group level by the end of the second year (Lawler & Mohrman, 1985). If this is so, the only way around this problem

is for quality circles to work on problems outside their own areas. However, this requires more coordination, information, and assistance for the development of a solution and more management effort for its implementation (Locke & Schweiger, 1979). Therefore, without considerable management interest at this stage, quality circles will begin to decline in number and effectiveness.

METHOD

Selection of Sample

A list of productivity principals for all DoD departments[1] was obtained from the headquarters office responsible for productivity programs in DoD. These principals were contacted to determine whether their departments had quality circle programs. Of the 15 DoD departments, only 6 reported such a program. These 6 were: Department of the Navy; Department of the Air Force; Department of the Army; Defense Logistics Agency; Defense Mapping Agency; and Defense Investigative Service. The productivity principals of these 6 departments/agencies were then interviewed as to the number, location, and points of contacts for their quality circles and also briefed as to the purpose of the study. All headquarters productivity principals agreed to participate.

To reduce the overall data collection burden for DoD organizations with large quality circle programs, statistical sampling procedures were used (Kalton, 1983). Assuming a 50 percent response rate, the number of quality circle programs necessary for a representative sample for each department was determined. Quality circle programs from the Army, Navy, Air Force, and Defense Logistics Agency (DLA) were randomly selected to ensure a representative population sample at the 95 percent confidence interval (+/-5%), the accepted standard (Kalton, 1983; Warwick & Lininger, 1975). A correction to these sample sizes was made to adjust for the finite sizes of these populations. Table 1 shows the number of organizations and the sample sizes for those departments to which sampling methods were applied.

Questionnaire Development

A structured telephone interview was developed to determine the basic characteristics, purpose, and size of each program. The interview protocol is provided in Appendix A. Following its development, the authors phoned the quality circle program coordinators from the 47 organizations identified. These individuals were also briefed as to the purpose of the study and requested to participate. All agreed.

Based on the literature and hypotheses described above, as well as information gleaned from the interviews, the authors developed four questionnaires. Each was designed for one hierarchical level within the organization. One questionnaire was developed for quality circle members (Appendix B), one for the quality circle program coordinators (Appendix C), one for the first-line supervisors of quality circle members (Appendix D), and another for managers who had subordinates in the quality circle program (Appendix E).

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[1]While there were DoD agencies and three DoD departments participating in this study, all will hereafter be referenced to as "departments" for ease of expression.

These four instruments concerned 10 areas: (1) respondent's demographics; (2) respondent's perceptions concerning the purpose of quality circles; (3) time used to participate in a quality circle; (4) the advantages of quality circles; (5) the manner in which quality circles are organized and the types of problems worked on; (6) obstacles to quality circle success; (7) support for quality circles from other parts of the organization; (8) the impact of quality circles on the organization; (9) types of quality circle training; and (10) the rewards received for participating in quality circles.

Additionally, the questionnaires for supervisors, managers, and program coordinators asked about their responsibilities to the quality circle program, the effect that the quality circle program had on their jobs, whether problems quality circles worked on were consonant with the goals of the organization, the rate of implementation of quality circle suggestions, the extent to which quality circle problems were amenable to cost/benefit analysis, and the extent to which management was updated concerning quality circle projects. The questions directed to the program coordinators covered all of the above areas but also requested a more detailed analysis of the program's history and cost-effectiveness.

Data Collection

A letter from the Defense Productivity Program Office was sent to 47 points of contact describing the questionnaires generally and requesting their support for this research project (Appendix F). The letter also informed the local quality circle principals to expect a package of questionnaires and return envelopes. The letters were mailed during the second week of December 1986.

Approximately one week after the letters were sent, the first of the questionnaire packages was mailed. Each package contained eight member and two supervisor questionnaires for each quality circle in the organization, one manager questionnaire for each five quality circles, and sufficient program coordinator questionnaires so that the program coordinator and all facilitators would have an opportunity to respond. The final package of questionnaires was mailed the last week in January 1987. One package destined for an Air Force Logistics Center was lost in the mail, one Army organization reported that it no longer had a quality circle program, one Defense Logistics Agency organization reported that it was about to become involved in a similar evaluative effort and could not participate in the present study, and one Navy organization could not participate because of union problems. These organizations were not replaced, resulting in a total of 43 organizations and 494 quality circles.

Because quality circles were the focus of the evaluation, the individual quality circle was used as the unit of analysis. To do this, the items for all member questionnaires for a particular quality circle were aggregated to reflect the mean or some percentage of responses (whichever was most appropriate) of that quality circle. At least three members had to respond before a quality circle was considered to have responded. While a minimum of three responses was required before a quality circle would be counted as a response, most quality circles had several more responses than required (mean = 5). The supervisory questionnaires associated with a particular quality circle were merged with the quality circle member data base. Manager and program coordinator information could not be aggregated with particular quality circles and were therefore left as individual responses.

Analysis Plan

The sections that follow in this report address the responses from the various groups to the basic demographic and program description questionnaire items. So few manager questionnaires were received that these data were not considered reliable and therefore were not analyzed. Basic descriptions of the quality circle programs as reported by the members, supervisors, and the program coordinators are provided. The authors then evaluated each hypothesis using circle member responses concerning percent of solutions implemented and degree of goal achievement as the criterion variables.

Several scales were developed and used in the analysis. The overall scale descriptions and reliability coefficients are presented in Appendix G.

QUESTIONNAIRE RESULTS FROM QUALITY CIRCLE MEMBERS

Demographics

This section describes the responses of quality circle members to a variety of questions about their experiences in the quality circle program. Table 2 presents demographic information on members. The total number of circles responding was 494.

Reasons for Joining

Table 3 presents all the reasons quality circle members gave for joining a quality circle. There was large agreement on why they volunteered. The five reasons for joining a quality circle common to all the services included: (1) "solve some problems and make my job easier"; (2) "solve a work-related problem"; (3) "get training"; (4) "find out what QCs were all about"; and (5) "a chance to express ideas." Reasons NOT mentioned included: (1) "directed by my supervisor"; (2) "supervisor wanted me to"; (3) "have an hour off my regular work"; (4) "lead to a promotion or pay raise"; and (5) "to be recognized."

Training

Table 4 presents quality circle member responses regarding the adequacy of different types of training. Training courses in problem-solving techniques, quality circle tools, and the purposes of quality circles were reported by all organizations to be adequate. However, training courses in how to make presentations to management and how to perform cost/benefit analyses on quality circle suggestions were reported more frequently as inadequate.

Quality Circle Meetings

Typically, quality circle meetings were held one hour per week. Some quality circle members met every 2 to 4 weeks, while others every 1 to 2 weeks. Quality circle members from all the organizations reported that they were allowed to go to circle meetings.

A one-way analysis of variance (ANOVA) revealed a significant difference among the departments ($p < .05$). The time since the last quality circle meeting was significantly

longer for DLA quality circle members than for Navy, Air Force, Army, DMA, and DIS quality circle members. Table 5 presents the means and standard deviations for each organization with regard to length of time since last meeting.

Responses to questionnaire items concerning attendance at quality circle meetings are presented in Table 6. Quality circle members reported that the program coordinator (PC) or a facilitator usually attended their meetings. Quality circle members from all the organizations reported that rarely did managers or department heads attend their meetings.

Quality Circle Meeting Dynamics

Table 7 presents the quality circle member responses concerning how meetings were conducted. The dynamics at circle meetings across the DoD organizations were very similar. This high degree of similarity is not surprising since clear guidelines for quality circle program administration and activities exist (Beardsley & Dewar, 1977; Rieker, 1980). All of the organizations reported that they had enough facilitators for their groups, that the quality circle group interaction was democratic, and that decisions were made by consensus. Quality circle members most often selected the problems to be worked on; quality circle leaders were the next likely ones to do the selecting. The six organizations differed, however, in the way the group leader was selected. Three of the six organizations reported that the leader of their quality circle volunteered, two of them reported that the leader was voted on by the group, and one organization reported that the facilitator was also the leader of the quality circle.

One of the basic distinctions between quality circle programs and quality of work life (QWL) programs involves the nature of the problems to be explored. QWL programs allow employees to investigate problems having to do with issues other than the work process itself that might positively affect worker performance. Quality circle programs, however, emphasize problems directly related to work processes and procedures. The responses from the six organizations indicated agreement regarding the nature of the problems tackled by the quality circles. These responses are also presented in Table 7. Problems involving inefficient processes, productivity, and quality were the three most frequently reported types of problems worked on by quality circles. Problems with safety and the physical environment of the work place were reported to be explored less frequently. Members from all of the organizations responded that the quality circle program supported the goals of the organization.

Location of Problems Within an Organization

Table 8 shows the percentage of people who reported that problems occurred outside of the work group or involved more than one work group. Such problems were viewed as obstacles to successful problem solving.

Results of a one-way ANOVA indicated a significant difference of opinion among the departments on whether the problems worked on by the quality circles were at the shop level and involved just one work group ($p < .05$).

Program Support

Table 9 shows the quality circle members' responses concerning the amount and type of support they receive for their quality circle activities. In general, all members reported that management was supportive of their activities. They also reported that

they thought management was interested in worker participation. All of the members reported that management showed a great deal of support for quality circles by providing the members with time, facilitators, and training.

Recognition

Table 10 presents the different types of recognition or rewards provided to members for quality circle participation. All but one organization provided some form of recognition. The most frequently cited way was through presentations by members to management (4 of 6 organizations).

Organizational Environment

High levels of organizational trust and stability are often mentioned in the quality circle literature as dimensions of an organization's culture necessary for successful program implementation. Table 11 shows the responses of quality circle members to a variety of questions concerning the organization's culture, environment, atmosphere, and management style. Members rated the culture of their organizations similarly. They reported that their organizations operated in uncertain environments, and that the atmosphere in the organization was neither friendly nor unfriendly. Members reported that their organizations were neither flexible nor inflexible (one exception), that the management style was participative, that the organization responded to the ideas of the work force, and that there was trust in the supervisor-subordinate relationships.

Turnover

It is important for the maintenance of a quality circle program that knowledgeable people continue to be active in it. Table 12 presents the percentage of circles that responded that turnover was an obstacle that had not yet been overcome.

Program Obstacles

Members were asked to respond to a list of potential obstacles to program success. Table 13 presents a condensed version of that list and the percentage of people who reported that the obstacle had not been overcome. The most often reported obstacles that organizations had NOT overcome included "employees losing interest," "management did not implement my quality circle ideas," "lack of trust in supervisor-subordinate relationship," "management not being interested in worker participation," "lack of support from non-quality circle members," and "lack of support from command."

One of the overlooked but very important aspects of maintaining a quality circle program is demonstrated dollar savings and whether the lack of signs of dollar savings is perceived as an obstacle to quality circle program success. Table 14 presents the percentage of circles that reported that "no signs of dollar savings" was an obstacle to program success that had not been overcome by their organizations. About one-fifth of all quality circles from all departments reported that lack of dollar savings was an obstacle that had not been overcome.

Goal Achievement

Table 15 displays a list of goals and how effective each quality circle program was at achieving them. Improved product or service quality and improved processes or procedures were two goals most frequently mentioned as being achieved through quality

circles in all the organizations. Reducing turnover/absenteeism and improving trust in management were two goals most frequently identified as NOT being achieved through quality circles.

Changes on Job

It was expected that the nature of members' jobs would change as a result of participating in a quality circle. Table 16 lists job characteristics and indicates how these characteristics changed as a result of program participation. The members reported no change in the time available to do their regular jobs, the complexity of the work, the amount of supervision received, and the amount of participative management. However, they reported an increase in the amount of trust between themselves and supervisors and in their own credibility with management.

Summary

In summary, the results of the members' responses indicate similarity among the organizations in the way the programs are administered. Differences were reflected in the responses to questions about the reasons for joining a quality circle, the regularity of attendance at meetings, the types of recognition received, the turnover among key quality circle personnel, and the degree of effectiveness of quality circle activities in achieving a variety of goals. The next section discusses the program coordinators' responses to the same issues.

QUESTIONNAIRE RESULTS FROM PROGRAM COORDINATORS

Program Coordinator Demographics

This section describes responses of program coordinators from 23 organizations to a variety of questionnaire items regarding their experiences as quality circle program coordinators. Results are presented below.

Table 17 presents descriptive information about program coordinators. Of interest is the percentage of suggestions implemented.

Reasons for Implementing a Quality Circle Program

As mentioned previously, quality circle programs have dual goals: improved productivity and quality and increased employee involvement. Table 18 shows the program coordinators' responses to a questionnaire item regarding the reasons for implementing a quality circle program. Some coordinators reported that improved productivity, improved quality, and increased employee involvement were the most important reasons for implementing a quality circle program. Others reported that they did so because they were directed to by management to improve productivity and morale.

Reasons for Justifying Quality Circle Programs

The hypothesis states that programs that have goals consistent with organizational goals will demonstrate greater solution implementation and goal achievement than programs that do not. Three reasons were rank-ordered by the program coordinators according to how frequently each was used to justify the existence of the quality circle program (Table 19). As the table demonstrates, the main justification appeared to be the identification of work-related problems, followed by actual cost savings, and by improved employee morale.

Members' Reasons for Joining

Program coordinators' responses to the item concerning quality circle members' reasons for joining the program are presented in Table 20. The coordinators were in strong agreement about the reasons they think members join. They included: "to solve a work-related problem," to receive "training in problem-solving techniques," "to express their ideas," and "to be recognized by management." Reasons NOT mentioned were: "to get an hour off work," "lead to a promotion or pay raise," and "supervisor wanted them to volunteer." By looking back at Table 3, the reader can see that the members' reasons for joining or not joining were very similar to those reported by the program coordinators.

Program Coordinator Duties

Table 21 shows the program coordinators' responses to the questionnaire item concerning their duties in the quality circle program. There is strong agreement among the six departments. All program coordinators reported that their duties were to "attend management presentations," "start new circles," "train," "collect cost/benefit data," "monitor follow-up on implementation of circle suggestions," and "attend QC meetings." They agreed that suggesting problems and implementing suggestions were not part of their duties.

Training

The types of training programs used by the different departments are presented in Table 22. The most frequently used training packages were those developed by Productivity Development Systems, by International Association of Quality Circles, and by in-house trainers.

Table 23 displays the responses of supervisors regarding the training they received. It indicates that there is very little training available to supervisors regarding the purposes of quality circles and their responsibilities to them.

Types of Problems Worked on by Quality Circles

The rank order of problem types worked on by quality circles as reported by the program coordinators is presented in Table 24a. The order is the same as that reported by the quality circle members. The top three types concerned inefficient processes, productivity, and quality problems. Problems dealing with the physical environment and safety were ranked the lowest. This, profile too, reflects the goals of quality circle programs.

Table 24b presents the responses to questions about how often quality circles worked on problems located in different departments in their own organizations or at management levels in different departments in their organizations.

Support

Table 25 shows the program coordinators' responses to the questions concerning the extent that management showed support for the quality circle program. Coordinators reported significant management support for "training," "members' time," and "recognition," but less support for "personnel development."

Recognition

Table 26 presents program coordinators' responses concerning recognition for quality circle participation. Most coordinators reported that recognition for participation was provided in the activity's paper and through presentations to management by quality circle members. Four of the six departments reported that their organizations used monetary and non-monetary rewards to recognize quality circle participation.

The members' perceptions of recognition differed from the program coordinators' perceptions. The coordinators reported that recognition was accomplished through announcements in activity newspapers, monetary and non-monetary rewards, and management presentations. The members concurred with only the last form of recognition cited (see Table 10).

Turnover

Table 27 presents the percentage of program coordinators who responded that turnover of quality circle personnel was an obstacle that the program had not overcome. These responses were consistent with those of the quality circle members.

Program Obstacles

Program coordinators were asked to respond to a list of potential obstacles to quality circle program success. Table 28 shows the percentage of program coordinators who said that the obstacles listed were not overcome. Obstacles to quality circle program success included lack of management support, lack of interest by management in worker participation, unrealistic expectations by management, lack of trust in supervisor-subordinate relations, management not implementing quality circle suggestions, and loss of interest by employees. Coordinators also reported as problems supervisors who would not let quality circle members go to meetings, lack of support from the non-quality circle employees, and lack of signs of improvement. Coordinators agreed that the following potential obstacles were NOT problems: lack of member training, lack of problems, lack of union support, and lack of problems at the quality circle level, competition from other involvement programs, and quality circle employees not knowing enough.

Goal Achievement

Table 29 presents the program coordinators' responses concerning the quality circle program's effectiveness at achieving a variety of goals. The number of goals quality circles were effective in meeting ranged widely across departments, with Navy reporting the most (11 of 13 goals or 85%) and DMA reporting the least (4 of 13 or 31%). Coordinators from all organizations agreed that their programs were effective at improving processes and procedures and improving work group communication. All agreed that their programs were "barely" effective at achieving trust in management. Program coordinator responses were very consistent with quality circle member responses.

Demonstrated Cost Savings

Table 30 shows the responses to the question regarding maintenance of cost/benefit records. Analyses across all departments showed that nearly 40 percent of the quality circle program coordinators kept no records at all. Of those reporting cost/benefit data,

85 percent reported a ratio of benefits to cost in dollars of at least 3 to 1. Finally, of those program coordinators who maintained cost/benefit data, most reported that both cost and benefit data were based on hard documentation rather than on estimates.

Summary

This section discusses both the strengths and weaknesses of DoD quality circle programs as reported by their members and program coordinators. One question often raised in the literature is whether or not members join quality circles because they generally want to participate and share ideas or because they want to get an hour a week off from work. Members reported joining primarily because of a desire to participate rather than for any tangible benefits such as advancement or recognition. Their reasons for joining quality circles were to participate and to share ideas, to solve work-related problems, and to receive problem-solving training.

Members seemed to receive adequate training in quality circle problem-solving techniques; however, the adequacy of their training with regard to other aspects of the quality circle process was suspect. For instance, quality circle members reported little training in cost/benefit analysis, and little training in how to deliver a quality circle presentation.

Another reported strength of the programs throughout DoD were the meetings. Members reported attending them regularly. Often the program coordinator or a group facilitator was present. Meetings were characterized as largely democratic. The leader seemed to most often be a volunteer, problems were selected democratically, and decisions were based on consensus. The similarity across departments on how the meetings were run was probably due to the problem-solving training the members received. However, responses to the questionnaire show that some current obstacles to the success of a quality circle program within DoD relate to meetings. They concern members whose jobs or supervisors do not permit them to attend meetings regularly.

Overall, the members reported that they received very little recognition for their quality circle participation. The recognition they did report receiving was through making presentations to management.

Members and the program coordinators had different perceptions regarding recognition. As mentioned previously, the members reported receiving recognition only through making management presentations. Program coordinators reported that members received recognition not only in this way but also through newspaper articles as well as monetary and non-monetary awards.

The problems that quality circles worked on were most often practical problems involving work process, product quality, or productivity, and that were compatible with organizational goals. Quality circles reported that they were most effective when involved with problems of this type. Members also reported on how participation in quality circles affected their jobs. In general, participation did not seem to generate any negative job outcomes. Participation increased members' credibility with management and trust between them and their supervisors. Participation also increased the amount of information members received. However, these changes did not necessarily mean that management itself was going to be more participative.

While management showed support for quality circles in terms of money, facilitators, training, and member time, they were less supportive of solution implementation, personnel development, and recognition.

Supervisors and managers reported that training in their duties and responsibilities was lacking. The training they did receive was similar to the problem-solving training received by members.

The research literature stresses the importance of demonstrating cost savings for the long-term success of any productivity improvement program. Program coordinators' reasons for justifying quality circle programs involved identifying work problems and demonstrating cost savings. Typically, they described cost savings in an anecdotal fashion, although overall program effectiveness was unknown.

The program coordinators reported that the primary reason for implementing a quality circle program was to improve productivity. The next most frequently cited reason was to increase employee involvement. However, lack of management interest in participation was an obstacle that had yet to be overcome.

The program coordinators reported that their duties involved attending presentations by quality circle members to management, starting new quality circles, training members, collecting cost/benefit data, and monitoring the process, but their duties did not include suggesting problems to explore or implementing solutions.

The coordinators reported that most quality circles were located within one shop in the same department and were rarely established across shops or at management levels.

The quality circle program was reported by the program coordinators to have achieved a variety of goals. These included greater productivity, improved product or service quality, improved processes or procedures, improved upward communication, increased employee involvement, and increased employee participation in decision making. Other areas reported to have improved were work group communications, work group morale, and quality of work life (QWL).

Although coordinators reported that their management was generally supportive of the program, they also reported that management was not interested in worker participation, that management expected too much too soon, that there were no improvements for top management to see, that there was a lack of trust between supervisor and subordinate, that turnover in key personnel was an obstacle, and that there was no "champion" for the quality circle program.

RESULTS

Measures

This section reports on the results of two outcome measures used to test the hypotheses described earlier that are concerned with what makes a quality circle program effective. These two measures provide complementary views of the effectiveness of quality circles. The first measure, percentage of solutions implemented, consists of a ratio of the number of solutions suggested to the number of solutions implemented. This measure reflects actions external to the quality circle group, that is, solution implementation is the prerogative of management. Table 31 presents circle member reports of the percentage of solutions implemented, approximately 70 percent overall.

The second outcome measure is called goal achievement. It is a mean rating of the quality circle members' reported level of achievement with regard to a variety of goals,

such as greater productivity. This measure reflects actions internal to the quality circle. Table 32 shows the mean for each goal for each department. Members from the different departments agreed that their programs were most effective at improving processes or procedures and least effective at reducing turnover and absenteeism. (Unless otherwise mentioned, analyses discussed in the following section are based on quality circle member responses.)

Most of the results presented below are correlational in nature (r), with probabilities (p) presented as an aid to interpretation. Both correlations and probabilities have a lower range of 0 and an upper range of 1.0. Correlations are measures of association, indicating the degree to which two things are associated. The larger the r, the more two variables are associated. Probabilities are measures of reliability and indicate that a correlation might have been a random occurrence. Thus, the lower the p value the less likely that the correlation is a chance occurrence, and that under similar conditions the more likely it is that the researchers should be able to find a p of approximately the same size. In the social sciences, a p value of .05 or less is considered sufficiently reliable such that the correlation represents a meaningful association between the two variables in the analysis.

Test of Hypotheses

Hypothesis 1: The more that quality circle members want to participate, the more effective a quality circle program will be.

The overall correlation between the scale indicating workers' desire to participate (scale 1 in Appendix G) and the percentage of solutions implemented was .02 ($p > .05$), while the correlation between the workers' desire to participate and level of goal achievement was .23 ($p < .001$). There appears to be no relationship between the members' desire to participate and the percentage of solutions implemented, but there is one between desire to participate and goal achievement. The more that workers desire participation, the higher the level of goal achievement. Table 33 presents for each department the correlations of members' desire to participate with the percentage of solutions implemented and reports of goals achieved.

Hypothesis 2: The higher the level of management support, the more effective the quality circle program will be.

The overall correlation between the scale indicating management's interest in worker participation (scale 2) and the percentage of solutions implemented was .21 ($p > .001$). This relationship indicates that the more management is interested and supports worker participation, the more likely solutions will be implemented. The overall correlation between management's interest in worker participation and the degree of goal achievement was .49 ($p < .001$). This relationship indicates that the more interested management is regarding participation of workers, the more effective the quality circle program is at achieving goals. Table 34 presents for each department the correlations of management interest with the percentage of solutions implemented and with the degree of goal achievement for the six departments.

In general, the circle members responded that the level of management support was related to goal achievement and, to a lesser extent, to the percentage of solutions implemented. This may be explained by the notion that although management may be supportive and provide resources for circle activities, there may not be a formal mechanism or organizational structure by which solutions can be implemented.

The existence of a steering group for the management of the quality circle program is another way to measure or operationalize the degree of management support. As mentioned earlier, steering committees are important to help guide, monitor, and implement solutions using program coordinator responses. The overall correlation between the existence of a steering committee and the percentage of solutions implemented was .41 ($p < .01$); there was no relationship between it and degree of goal achievement. In conclusion, when management is interested in worker participation or a steering committee for the quality circle program exists, solution implementation increases.

Hypothesis 3: The more the organization's problems are able to be solved at the work group level, the more effective the quality circle program will be.

The overall correlation between the scale indicating existence of problems at the shop level (scale 8) and percentage of solutions implemented was .08 ($p < .06$), while the correlation between their existence at the shop level and goal achievement was .45 ($p < .001$). The correlations indicate that while there is a tendency for solutions to problems existing at the shop level to be implemented, this relationship is not a strong one, probably because of management policies and procedures. The relationship between ability to solve shop-level problems and goal achievement was a strong one. Table 35 presents for each department the correlations between the existence of problems at the shop level and the percentage of solutions implemented as well as the degree of goal achievement.

Hypothesis 4: The greater the degree of organizational trust and stability and the greater the support from the union, the more effective the quality circle program will be.

The overall correlation between the scale indicating degree of organizational trust and stability (scale 4) and the percentage of solutions implemented was .13 ($p < .003$). The correlation between this element and degree of goal achievement was .40 ($p < .001$). These correlations indicate that when the organization rates high on trust and stability, the percentage of solutions implemented and the degree of goal achievement will be high. Table 36 presents the correlations. Further, while union support was significantly related to goal achievement ($p < .05$), it was not related to the percent of solutions implemented ($p > .05$).

Hypothesis 5: The more that management is trained in responsibilities associated with the quality circle program, the more effective the quality circle program will be.

The overall correlation between the scale indicating adequacy of training for supervisors (scale 14) and the percentage of solutions implemented was .16 ($p < .006$), while the overall correlation between that element and goal achievement was .07 ($p > .05$). These overall correlations indicate that training of supervisors and managers relative to the quality circle program is related to increased solution implementation, but not to the members' perception of goal achievement. Table 37 presents the correlations.

Hypothesis 6: The more democratic the organization when setting up the quality circle program, the more effective the quality circle program will be.

The overall correlations between degree of democratic group interaction and percentage of solutions implemented was -.06 ($p < .07$), while the correlation between that element and goal achievement was .19 ($p < .001$). Table 38 presents the correlations.

The overall correlation between the degree of consensus-based group decision making and percentage of solutions implemented was .07 ($p < .06$), while the overall correlation between that element and goal achievement was .29 ($p < .001$). Table 39 presents the correlations. Generally, the more a quality circle interacted democratically and made decisions by consensus, the higher its reported achievement of goals. However, the percent of solutions implemented was not related to the dynamics of the circle meetings.

Hypothesis 7: The more frequent the quality circle meetings, the more effective the quality circle program will be.

There was no relationship between the regularity of quality circle meetings (scale 6) and the percentage of solutions implemented, but there was a relationship between regularity of meetings and goal achievement. The overall correlation between regular quality circle meetings and percentage of solutions implemented was -.04 ($p > .05$); between that element and goal achievement the correlation was .48 ($p < .001$). This relationship indicates that the shorter the time between meetings the greater the goal achievement. Table 40 presents the correlations.

The supervisors provide another source of information regarding quality circle meetings. They responded to two items (combined into a single scale, scale 15) concerning whether quality circle members were allowed to attend meetings and whether the jobs allowed for regular attendance. The overall correlation between regular meetings and the percentage of solutions implemented as reported by supervisors was -.01 ($p > .05$), while the overall correlation between regular meetings and goal achievement was .24 ($p < .01$). Much like the members, supervisors indicated that the greater the difficulty the quality circle had holding regular meetings, the fewer goals reached.

Hypothesis 8: The more that quality circle members perceive that they have sufficient information to work on problems outside of their own work areas, the more effective the quality circle program will be.

The overall correlation between sufficient information (scale 7) for problem solving and percentage of solutions implemented was -.06 ($p < .07$). Although the relationship is weak, the correlation indicates that when information is not sufficient, fewer solutions are implemented. The overall correlation between sufficient information and goal achievement was .23 ($p < .001$). Table 41 presents the correlations.

Hypothesis 9: The greater the extent to which quality circle goals are consistent with management goals, the more effective the quality circle program will be.

The overall correlation between the degree the quality circle program supported the mission of the organization and the percentage of solutions implemented was only .09 ($p < .05$). However, the overall correlation between the degree the quality circle program supported the goals of the organization and the level of goal achievement was .51 ($p < .001$). The relationships indicate that when the quality circle program supports the goals of the organization, the more likely solutions will be implemented and the higher the level of goal achievement. Table 42 presents the correlations.

Hypothesis 10: The less management is concerned about infringement of its power, the more effective the quality circle program will be.

The overall correlation between the scale indicating concern about infringement of power (scale 13) and percentage of solutions implemented was .14 ($p < .001$), while the

overall correlation between that element and goal achievement was .45 ($p < .001$). In general, the less that management is concerned about infringement of its power, the more solutions are implemented and goals achieved. Table 43 presents the correlations.

Hypothesis 11: Quality circles whose members receive monetary payments for their suggestions will be more effective than those whose members receive no such payments.

The overall correlation between monetary rewards and the percentage of solutions implemented was .04 ($p > .05$), while the overall correlation between the monetary rewards and goal achievement was .27 ($p < .001$). This relationship indicates that goal achievement is greatest when monetary recognition is offered. Table 44 presents the correlations.

Hypothesis 12: The lower the turnover in management and/or quality circle personnel, the more effective the quality circle program will be.

The overall correlation between the scale indicating the amount of turnover of key quality circle personnel (scale 11) and the percentage of solutions implemented was .14 ($p < .002$) and between that element and goal achievement was .45 ($p < .001$). Both correlations indicate that when turnover of quality circle personnel is low, more solutions are implemented and more goals are achieved. Table 45 presents the correlations.

Hypothesis 13: The more that quality circles are able to demonstrate cost-effectiveness, the more effective the quality circle program will be.

The overall correlation between the scale demonstrating cost savings (scale 10) and the percentage of solutions implemented was .13 ($p < .002$), while the overall correlation between that element and goal achievement was .42 ($p < .001$). These correlations indicate that when cost savings are demonstrated, it is more likely that solutions will be implemented and goals achieved. Table 46 presents the correlations.

The frequency of gathering cost estimates is important information in interpreting this finding. The overall correlation from the program coordinator responses of whether cost/benefit records are maintained with the percentage of solutions implemented was .40 ($p < .01$), while the overall correlation of the maintenance of cost/benefit records with goal achievement was .44 ($p < .007$). This may mean that just keeping records may result in more solutions implemented and goals achieved.

Hypothesis 14: The more that quality circles are integrated into the structure of the organization, the more effective the quality circle program will be.

Table 47 shows the location of the quality circle programs within the various organizational structures. The location indirectly demonstrates the level of support from top management for the program. It is expected that programs placed directly under the commanding officer or in production departments will be more successful than those placed in the personnel or human resources departments. The location is important because it indicates to the entire organization management's commitment to the program.

The overall correlation between degree of quality circle integration into the organization and the percentage of solutions implemented was .14 ($p < .001$), while the overall correlation between quality circle organizational integration and goal achievement was .61 ($p < .001$). These correlations support the hypothesized association between the integration of the program and overall quality circle effectiveness. Table 48 presents the correlations.

Hypothesis 15: The older a quality circle, the lower will be its effectiveness.

Table 49 presents the number of circles and their life spans. The overall correlation between the age of a quality circle and the percentage of solutions implemented was .72 ($p < .001$), while the overall correlation between age of the quality circle and goal achievement was .06 ($p < .09$). Table 50 presents the correlations.

This finding runs contrary to the hypothesized relationship. It was thought that the older the circle the less likely it would be effective. However, the age of the circle is strongly and positively correlated with the number of solutions implemented. It is likely that older circles have survived because they have performed well and received support from management.

Correlations were performed between the age of the quality circle and all scales used in this study (see Appendix G). Three correlations were significant. First, age was negatively correlated with the adequacy of the circle's quality circle training ($r = .16$, $p = .001$). Poorer trained circles were less likely to survive to another age. Second, the age of the quality circle was positively correlated with its ability to show cost savings in its solutions ($r = .10$, $p = .027$). The test for hypothesis 13 showed that the ability to demonstrate cost-effectiveness was related to its overall effectiveness. Here we see that it is also related to the circle's age, possibly to its ability to survive. Finally, the age of the circle was related to lower turnover in key quality circle personnel, providing further support for hypothesis 12 ($r = .21$, $p < .001$).

DISCUSSION

Hypotheses

Table 51 presents the results of the tests of each of the 15 hypotheses for the two outcome measures--goal achievement and the percent of solutions implemented. Of the 30 tests, 22 (73%) were significant at the .05 alpha level. Seven were significant for both the percentage of solutions implemented and for goal achievement.

There were more significant outcomes using goal achievement as the dependent measure (86%) than using the percentage of solutions implemented (60%). One may begin to understand this disparity by examining the two strongest relationships associated with the percent of suggestions implemented: (1) the extent to which cost-effectiveness could be demonstrated and (2) the extent to which quality circles were integrated into the organization's structure (hypotheses 13 and 14, respectively). At the most obvious level it appears that if quality circles are to implement solutions, a structure or process must exist for that implementation. Second, mere collection of cost/benefit data improves the likelihood of solution implementation, probably indicating proven savings in the past resulting from quality circle suggestions. However, these conclusions do not explain the differences between the results for the two measures of quality circle effectiveness. Closer examination of the two measures leads to a more telling distinction. Implementation of solutions is a process over which quality circles have no control. Goal achievement refers to actions by the quality circles.

Examination of other hypotheses significantly correlated with the percent of suggestions implemented supports the conclusion that quality circles have little control over the implementation of their suggestions. Organizational trust and stability, degree of management training, management concern with infringement of power, etc., are all factors over which the quality circle has no control. In fact, every hypothesis that has a

statistically significant association with percent of suggestions implemented represents a condition over which quality circles have no control. Importantly, the factors over which quality circles have some control (e.g., regularity of meetings) are not associated with that measure in any way.

It appears that even though the quality circles operate in accordance with accepted procedures, meet regularly, operate democratically, and generally follow what they learned in training, the program as a whole may not be effective at changing the organization. Support by management is necessary for solutions to be implemented. In fact, making presentations to management may be the only influence circles have over solution implementation, and it should be noted that quality circle members report receiving virtually no training in this important activity.

Though the factors over which quality circles have the most control are not significantly related to the percent of suggestions implemented, those over which they have control are significantly related to the achievement of quality circle goals. These findings illustrate the delicate nature of quality circle success. Many factors contribute to it, but only some are under the control of the members or their coordinator. For quality circles to be successful, management must support quality circle suggestion implementation and do their best to shield quality circles from conditions that hamper success.

While only a few hypotheses were strongly associated with the percent of suggestions implemented, there was consistent and strong association of the hypothesized variables with the achievement of goals. Quality circles reported that their activity not only led to practical outcomes for the shop (e.g., improved productivity) but also resulted in less tangible benefits, such as improved superior-subordinate trust and increased credibility with management. While it would be difficult to place a dollar value on these outcomes, they must be considered important outcomes for the organization as a whole and the individuals who belong to it.

Dynamics of Quality Circle Membership

While it is obvious that the respondents to our questionnaire desired to participate in quality circles, their reasons for doing so were not obvious. There were two general groups of responses quality circle members could make when describing why they joined a quality circle, one had to do with personal gain (e.g., looking good on the record) and the other with a genuine desire to improve the organization (e.g., solving work-related problems). By far the most prevalent response concerned the desire to improve the organization. While this may not be surprising in a self-report questionnaire filled out by members, the same reasons were reported by first-level supervisors and higher levels of management.

Members indicated that monetary recognition would be useful in keeping the quality circle operating. However, little monetary recognition was reported (Table 10). In fact, quality circle members reported that outside of presentation by them to management, they received little recognition of any type for their quality circle work. Program coordinators, however, reported a great deal more recognition than that reported by members; this recognition also took many forms (Table 26). This difference in perception by program coordinators may be negatively influencing the viability of some DoD quality circle programs.

Quality circles face other difficulties in attempting to improve their organizations. While members reported that they received sufficient training on quality circle problem-solving techniques, they received virtually no training in cost/benefit analysis or in preparing and making management presentations. These are serious deficiencies. Suggestions have a higher likelihood of being implemented if the organization collects cost/benefit data as a standard part of the quality circle process. And if management presentations are the only form of recognition, as reported by quality circle members, then training in how to do a convincing job is essential to program effectiveness.

The effects that membership in a quality circle had on workers were also interesting. Generally, the time taken to perform their regular jobs, the complexity of their regular jobs, the amount of supervision, and the level of participative management did not change as a result of membership in a quality circle. The lack of improvement in participative management may well indicate that supervisors are not a part of the quality circle process. This agrees with the supervisors' reports that supervisors received little or no training concerning the quality circle process or their responsibilities in that process. However, quality circles did seem to improve the amount of trust between supervisor and subordinate (though presumably not through participative management) as well as the quality circle members' credibility with management, and to increase the members' job responsibilities.

The most noteworthy obstacles that quality circle members reported had not been overcome included loss of interest on the part of quality circle members, lack of solution implementation by management, lack of demonstrated dollar savings, lack of member training, and the lack of support from non-quality circle employees. These obstacles, reported by at least one fifth of all quality circles, seemed to reflect those areas over which the quality circles had little or no control. These obstacles also seemed to reflect the lack of integration of quality circles into the rest of the organization, pointing to the need for training of a broad cross-section of the organization's managers and supervisors concerning their responsibilities to the program. A quality circle program should include more than quality circle members and program coordinators.

CONCLUSIONS

1. Before implementation of a quality circle program, an assessment of the degree to which management is interested in worker participation should be performed. Action can then be taken to minimize any problem in this regard before implementation.

2. Management should establish clear objectives and goals concerning the types of problems that their quality circles work on.

3. Management should develop a formal policy specifying individual management responsibilities for quality circle suggestion implementation. The formation of a steering group could be part of that policy.

4. Supervisors and managers should receive training as to the purpose of and their responsibilities to the organization's quality circle program. Recognition of managers who implement suggestions is also recommended as a way to promote greater interest among managers in the program.

5. While quality circle members seem to receive adequate training for problem solving and solution development, they receive little training in how to make management presentations. Since management presentations seem to be the only form of recognition received by quality circles, they should be given the greatest opportunity to succeed. Quality circle members should receive thorough training in this important activity. Other forms of recognition should also be established.

6. Cost/benefit data should be systematically collected for all quality circle suggestions. Members should be trained to perform these analyses as part of the regular quality circle process, with cost/benefit data passed on to the quality coordinator. This step will be advantageous to organizations with quality circle programs or to those wishing to start such programs for three important reasons: First, collection of cost/benefit data as a standard part of the suggestion implementation process promotes suggestion implementation and continued member interest. Even the best trained quality circles will be ineffective if suggestions are not implemented. Second, costs of training and maintaining quality circles will be difficult to justify in an audit if organizations have not collected information on costs and benefits. Third, quality circle provision of cost/benefit information will reduce the burden on management staff to perform these analyses.

Table 1

Response of DoD Organizations to Request
for Participation in the Quality Circle Study

Organization	Number of Organizations	Number of QCs
Navy	12	75
Air Force	5	65
Army	10	207
DLA	17	120
DIS	2	10
DMA	1	17
Total	47	494

Table 2

Quality Circle Member Demographics

Item	Navy	Air Force	Army	DMA	DLA	DIS
Male (%)	72	44	27	34	53	84
Female (%)	28	56	73	66	47	16
Educational level	some college	some college	some college	college grad	some college	some college
Years at present activity (mean)	9	6	7	5	7	5
Years a member of QC	1-2	1-2	1-2	1/2-1	1/2-1	1-2
Number of QCs responding	75	65	207	17	120	10
Average number of members/QC	5	5	6	5	5	5

Table 3

Reasons for Joining a Quality Circle as Perceived by Members

Reason	Navy	Air Force	Army	DMA	DLA	DIS
1. Solve problems, make job easier	Yes	Yes	Yes	Yes	Yes	Yes
2. Solve work-related problems	Yes	Yes	Yes	Yes	Yes	Yes
3. Training	Yes	Yes	Yes	Yes	Yes	Yes
4. Supervisor wanted me to	No	No	No	No	No	No
5. Find out what QCs about	Yes	Yes	Yes	Yes	Yes	Yes
6. Get an hour off work	No	No	No	No	No	No
7. Get recognition	No	No	No	No	No	No
8. Look good on record	No	No	No	Yes	No	No
9. Lead to raise, promotion	No	No	No	No	No	No
10. Wanted to express ideas	Yes	Yes	Yes	Yes	Yes	Yes
11. Recognized by management	No	No	No	Yes	Yes	No
12. Directed to	No	No	No	No	No	No

Note. Reasons given are not rank-ordered.

Table 4

Adequacy of Training as Perceived by Members

Training Area	Navy	Air Force	Army	DMA	DLA	DIS
Problem-solving techniques	to a large extent	to some extent	to some extent	to some extent	to some extent	to some extent
QC tools	to some extent	to some extent	to some extent	to some extent	to some extent	to some extent
Purposes of QCs	to some extent	to some extent	to some extent	to some extent	to some extent	to some extent
Presentations	to some extent	to some extent	to some extent	to a little extent	to a little extent	to some extent
Suggestion implementation, cost/benefit analyses	to a little extent	to some extent	to some extent	to a little extent	to a little extent	to a little extent

Note. A five-point scale was used to measure response to the question, "To what extent have you received adequate training in the following areas?"

Table 5

Time Since Last Quality Circle Meeting as Perceived by Members

Measure	Navy	Air Force	Army	DMA	DLA	DIS
Mean	1.90	1.76	1.79	1.48	2.69	1.83
SD	1.29	1.17	1.28	.73	1.66	.84

Note. The scale values ranged from 1 = 1 week; 2 = 2 weeks; 3 = 1 month; 4 = 2 months; 5 = more than 2 months.

Table 6

Attendance at Quality Circle (QC) Meetings
as Perceived by Members

Attendance Items		Navy	Air Force	Army	DMA	DLA	DIS
Weeks since last QC meeting		1-2	1-2	1-2	1-2	2-4	1-2
Hours provided to perform QC duties per week	Mean	1.46	2.37	1.38	1.78	1.54	1.13
	SD	1.26	3.45	.69	.72	1.49	.27
Actual hours to perform QC duties per week	Mean	1.84	2.60	2.06	1.87	1.99	1.33
	SD	1.08	2.44	1.74	.59	1.40	.35
QC members allowed to go to meetings		yes	yes	yes	yes	yes	yes
Job interferes with regular meetings		no	no	no	no	yes	no
Frequency that program coordinator or facilitator attends meetings		usually	usually	usually	usually	sometimes	rarely
Frequency that dept. head or manager attends meetings		rarely	rarely	sometimes	never	rarely	rarely

Table 7

Dynamics of Quality Circle (QC) Meetings as Perceived by Members

Area	Navy	Air Force	Army	DMA	DLA	DIS
Enough facilitators for our QC	yes	yes	yes	yes	yes	yes
How QC selected	volunteered	group voted	volunteered	volunteered	group voted	facilitator
Extent to which group interaction is democratic	to a large extent	to a large extent	to a large extent	to a large extent	to a large extent	to a large extent
Extent to which decisions made by consensus	to a large extent	to a large extent	to a large extent	to a large extent	to a large extent	to a large extent
Three most frequent ways of selecting QC problems	members leader manager	members leader facilitator	members leader facilitator	members leader facilitator	members leader facilitator	members leader program coordinator
Rank order of problems worked on	processes productivity quality phy env safety	processes quality productivity safety phy env	processes productivity quality safety phy env	processes quality phy env productivity safety	processes productivity quality phy env safety	processes productivity quality phy env safety
QC program supports organizational goals	to a large extent	to a large extent	to a large extent	to a large extent	to a large extent	to a large extent

Table 8

Members Who Reported that Problems Occurring Outside of the Quality Circle Level or Involving More Than One Work Group Were Obstacles to Program Success
(%)

Items	Navy	Air Force	Army	DMA	DLA	DIS	Total
Problems Occurring outside of the quality control level	18.80	18.43	14.88	25.58	25.30	22.19	19.04
Problems involving more than one work group	16.01	13.24	15.99	25.17	20.77	10.01	17.02

Table 9

Management Support for Quality Circles as Perceived by Members

Item	Navy	Air Force	Army	DMA	DLA	DIS
Command support	yes	yes	yes	yes	yes	yes
Management support	yes	yes	yes	yes	yes	yes
Headquarters support	yes	yes	yes	yes	yes	yes
Management interested in worker participation	yes	yes	yes	yes	yes	yes
Extent management shows support:						
Money	some	little	some	some	little	some
Training	large	some	large	some	some	some
Facilitators	large	large	large	large	large	large
Members' time	large	large	large	large	large	large
Recognition	some	some	some	some	some	large
Personnel development	some	some	some	some	some	some
Solution implementation	some	some	some	large	some	large
Verbal support	some	some	some	large	some	some

Table 10

Recognition for Quality Circle (QC) Participation as Perceived by Members

Form of Recognition	Navy	Air Force	Army	DMA	DLA	DIS
QC newsletter	no	no	no	no	no	no
Activity paper	no	no	no	yes	no	no
Presentations to management	yes	no	yes	yes	no	yes
Non-monetary rewards	no	no	no	no	no	no
Monetary rewards	no	yes	yes	no	no	no

Table 11

Organizational Trust and Stability as Perceived by Members

Item	Navy	Air Force	Army	DMA	DLA	DIS
Organization in uncertain environment	some	some	some	little	some	little
Organization friendly/ unfriendly	neither	neither	neither	neither	neither	neither
Lack of trust in supervisor-subordinate relations	no	no	no	no	no	no
Organization flexible/ inflexible	neither	neither	neither	neither	neither	flexible
Participative management style	yes	yes	yes	yes	yes	yes
Organization responds to work force ideas	fairly well	fairly well	fairly well	fairly well	fairly well	quite well

Table 12

Turnover of Quality Circle (QC) Personnel: A Continuing Obstacle to Program Success as Perceived by Members
(%)

Item	Navy	Air Force	Army	DMA	DLA	DIS
My leader lost interest	11.42	6.09	13.02	4.76	16.28	13.58
Turnover in top management	10.06	11.95	10.77	15.65	10.70	3.92
Turnover in key personnel in QC program	13.74	10.22	10.00	22.40	15.94	26.23
No champion for QC program	14.33	15.00	8.14	11.42	18.91	10.09

Table 13

Continuing Obstacles to Quality Circle (QC) Success as Perceived by Members
(%)

Obstacle	Navy	Air Force	Army	DMA	DLA	DIS
Lack of own command support	18.14	21.16	16.60	16.79	21.09	16.17
My management is not supportive	21.47	24.38	24.60	14.08	25.44	8.16
Lack of support from headquarters	8.81	10.13	8.90	4.90	15.20	1.42
Job doesn't allow for regular meetings	10.56	5.08	8.31	6.86	16.24	7.67
Supervisor doesn't let members go to meetings	3.50	5.74	5.20	1.47	3.50	1.25
Management not interested in worker participation	14.99	19.06	19.61	10.45	25.17	9.83
QCs ran out of problems	4.45	8.19	8.33	3.92	11.24	13.42
Management expects too much too soon	9.79	6.99	7.23	1.82	12.94	7.83
Lack of support from union	6.49	8.45	8.25	4.11	9.37	1.66
Employees lose interest	44.12	33.68	40.88	39.78	51.90	55.73
Competition from other involvement programs	7.55	3.03	5.67	3.48	9.21	12.85
Not enough facilitators for our QC	7.94	6.34	7.81	1.96	13.40	12.85
Management did not implement my QC's ideas	21.59	23.53	25.29	15.47	23.92	19.99
QC employees don't know enough	5.64	6.78	8.47	8.78	11.51	11.01
Lack of support from non-QC members	29.08	21.26	28.42	31.62	26.10	23.97
Problem not at QC level	18.80	18.43	14.88	25.58	25.30	22.19
Lack of job security for QC members	2.87	3.08	5.54	1.96	4.29	1.25
Lack of trust in supervisor-subordinate relations	25.13	26.12	27.88	14.20	24.98	19.42
No improvement for management to see	10.03	6.71	7.77	.98	17.54	6.19
Lack of member training	14.66	18.38	17.07	26.07	28.27	32.23

Table 14

Signs of Cost Savings as Perceived by Members
(%)

Item	Navy	Air Force	Army	DMA	DLA	DIS	Total
No signs of dollar savings	23.49	19.36	20.12	17.86	26.60	23.78	22.14

Table 15

Effectiveness of Quality Circle Activities in Achieving Goals
as Perceived by Members

Goal	Navy	Air Force	Army	DMA	DLA	DIS
1. Greater productivity	BE	E	E	BE	BE	E
2. Improved product or service quality	E	E	E	E	BE	E
3. Improved processes or procedures	E	E	E	E	BE	E
4. Improved worker satisfaction	BE	E	E	BE	BE	E
5. Improved upward communication	BE	E	E	E	BE	E
6. Reduced turnover, absenteeism	I	BE	BE	I	I	I
7. Increased work force involvement	BE	E	E	BE	BE	E
8. Improved employee analytic skills	E	E	E	BE	BE	E
9. Increased employee participation in decision making	BE	E	E	BE	BE	E
10. Improved trust in management	I	BE	I	I	I	BE

Note. The following scale was used: VE = Very effective; E = Effective; BE = Barely effective; I = Ineffective; VI = Very ineffective.

Table 16

Effects of Quality Circle Program on Aspects of the Job as Perceived by Members

Aspect	Navy	Air Force	Army	DMA	DLA	DIS
Time available to do regular job	NC	NC	NC	D	D	NC
Complexity of the work	NC	NC	NC	NC	NC	NC
Amount of supervision I receive	D	NC	NC	NC	NC	NC
Amount of information I receive	I	I	NC	I	NC	NC
Amount of participative management in my area	NC	NC	NC	NC	NC	NC
Number of responsibilities in my job	I	I	I	I	NC	NC
My own credibility with management	I	I	I	I	I	I
Amount of trust between myself and my supervisor	I	I	I	I	NC	I

Note. I = Increased; NC = No change; D = Decreased.

Table 17

Program Coordinator (PC) Demographics

Item	Navy	Air Force	Army	DMA	DLA	DIS
Number of PCs responding	8	4	13	1	8	1
Male (%)	21	13	31	0	71	100
Female (%)	79	87	69	100	29	0
Average length of time (yrs) as QC program coordinator	2-3	1-2	2-3	--	6 mo-1 yr	--
Average number of circles	21	35	35	39	9	8
Average number of employees in organization	5637	9017	2726	4000	1859	200
Average number of suggestions made	88	784	205	132	52	0
Percent of suggestions implemented	60	55	72	100	38	0

Table 18

Reasons for Implementing Quality Circle Program
as Perceived by Program Coordinators
(Rankings)

Reason	Navy	Air Force	Army	DMA	DLA	DIS
Headquarters directed	7	6	1	5	2	3
Improved productivity	1	1	4	4	1	4
Improved quality	3	2	6	3	7	2
Improved communication	4	3.5	5	1	4	5
Improved morale	5.5	6	2.5	6.5	4	6.5
Command directed	5.5	6	2.5	6.5	4	6.5
Increased employee involvement	2	3.5	7	2	6	1

Note. Scale ranged from 1 = Greatest degree of impact to 7 = Least degree of impact.

Table 19

Reasons Used for Program Justification as
Perceived by Coordinators
(Rankings)

Reason	Navy	Air Force	Army	DMA	DLA	DIS
Improved employee morale	3	2.5	2.5	2	3	1
Actual cost savings	2	2.5	2.5	3	2	3
Identification of work problems	1	1	1	1	1	2

Note. Scale ranged from 1 = Most often used to 3 = Least often used.

Table 20

Reasons Members Joined Quality Circle (QC) Programs as Perceived by Program Coordinators

Reason	Navy	Air Force	Army	DMA	DLA	DIS
1. Solve work-related problems	yes	yes	yes	yes	yes	yes
2. Training in problem-solving techniques	yes	no	no	yes	yes	no
3. Express ideas	yes	yes	yes	yes	yes	yes
4. Find out about QCs	no	yes	yes	no	yes	no
5. Get an hour off work	no	no	no	no	no	no
6. Supervisor recognition	no	yes	yes	no	yes	no
7. Look good on record	no	yes	no	no	no	no
8. Lead to promotion or pay raise	no	no	no	no	no	no
9. Supervisor requested	no	no	no	no	no	no
10. Recognized by management	yes	yes	yes	yes	yes	yes

Note. Yes = Reason present; No = Reason absent. The reasons are not rank-ordered.

Table 21

Program Coordinator Duties

Duty		Navy	Air Force	Army	DMA	DLA	DIS
1. Attend management presentations		yes	yes	yes	yes	yes	yes
2. Suggest problems		no	no	no	no	no	no
3. Implement suggestions		no	no	no	no	no	no
4. Start new QCs		yes	yes	yes	yes	yes	yes
5. Train members and management		yes	yes	yes	yes	yes	yes
6. Collect cost/benefit data		yes	yes	yes	yes	yes	yes
7. Monitor and follow-up implementation		yes	yes	yes	yes	yes	no
8. Attend meetings		yes	yes	yes	yes	yes	yes
9. Hours to perform QC duties per week (provided)	Mean	19.26	7.89	26.75	40.00	16.01	20.00
	SD	20.56	12.53	19.93	0.00	17.26	0.00
10. Hours to perform QC duties per week (actual)	Mean	20.30	12.75	29.62	40.00	16.96	25.00
	SD	19.56	14.17	16.44	0.00	15.27	0.00

Note. Yes = Duty present; No = Duty absent.

Table 22

Types of Quality Circle Training

Training Package	Navy	Air Force	Army	DMA	DLA	DIS
1. Productivity Development Systems	yes	--	yes	yes	yes	yes
2. IAQC	yes	--	yes	yes	yes	--
3. In-house	yes	yes	yes	--	yes	--
4. Beardsley and Associates	yes	--	--	--	--	--
5. AFIT	--	yes	--	--	yes	--
6. AMETA	--	--	yes	yes	yes	--
7. Interspan	--	--	--	yes	yes	--
8. Sperry	--	--	yes	--	--	--
9. Reickert	--	--	--	--	yes	--
10. Circle America Now	--	--	--	--	yes	--
11. Juran	--	--	yes	--	--	--
12. AMCCOM	--	--	yes	--	--	--

Table 23

Adequacy of Supervisory Training as Perceived by the Supervisors

Item	Navy	Air Force	Army	DMA[a]	DLA	DIS
Percent receiving no training about QC purpose						
Mean	75.71	56.00	74.14	--	60.76	75.00
SD	38.35	48.56	36.71	--	42.84	41.83
Percent adequate training about QC purpose						
Mean	17.34	26.00	12.92	--	27.69	25.00
SD	34.68	43.58	28.11	--	39.55	41.83
Percent receiving no training about QC responsibilities						
Mean	67.34	42.00	69.72	--	49.23	66.66
SD	41.52	47.16	38.62	--	45.49	51.63
Percent adequate training in responsibilities						
Mean	28.57	30.00	19.72	--	34.61	33.33
SD	42.08	45.64	32.34	--	42.31	51.63

Note. The scale values for the combined questions ranged from 1 = No training; 2 = Yes, training, but inadequate, to 3 = Yes, adequate training.

[a]So few supervisory questionnaires were received from DMA organizations that it rendered correlational analysis unreliable.

Table 24a

Problems Most Frequently Worked on by Quality Circles
as Perceived by Program Coordinators
(Rankings)

Problem Type	Navy	Air Force	Army	DMA[a]	DLA	DIS
1. Physical environment	4	4	4	1	4	2
2. Quality problems	3	2	3	1	5	4
3. Inefficient processes	1	1	1	1	1	1
4. Productivity	2	3	2	1	3	5
5. Safety	5	5	5	1	2	3

Note. Scale ranged from 1 = Most frequently to 5 = Least frequently.

[a]DMA ranked all problems the same.

Table 24b

Frequency with which Quality Circles Work on Problems from Other Areas as Perceived by Program Coordinators

Area	Navy	Air Force	Army	DMA	DLA	DIS
Problems at:						
One shop, same department	usually	always	always	sometimes	usually	usually
Across shops, same department	sometimes	rarely	sometimes	sometimes	usually	usually
Management level, same department	rarely	rarely	sometimes	rarely	sometimes	rarely
Management level, across departments	rarely	never	sometimes	sometimes	sometimes	rarely

Note. The scale used to rate how often quality circles worked on problem types ranged from 1 = Always; 2 = Usually; 3 = Sometimes; 4 = Rarely; and 5 = Never.

Table 25

Extent to Which Management Supported Quality Circles as Perceived by Program Coordinators

Support Area	Navy	Air Force	Army	DMA	DLA	DIS
Money	little	little	some	little	some	large
Training	some	large	large	some	some	large
Facilitators	some	little	large	some	large	large
Members' time	some	some	large	some	large	large
Recognition	some	some	large	some	large	large
Personnel development	little	little	some	some	some	large
Solution implementation	some	some	some	some	large	large
Verbal support	some	little	large	some	some	large

Table 26

Recognition for Quality Circle Participation as Perceived by Program Coordinators

Form of Recognition	Navy	Air Force	Army	DMA	DLA	DIS
QC newsletter	no	no	yes	no	no	yes
Activity paper	yes	yes	yes	yes	yes	no
Presentations to management	yes	no	yes	yes	yes	yes
Non-monetary rewards	no	no	yes	yes	yes	yes
Monetary rewards	no	no	yes	yes	yes	yes

Note. Yes = Reward present; No = Reward absent.

Table 27

Turnover of Quality Circle (QC) Personnel: A Continuing Obstacle to Program Success as Perceived by Program Coordinators (%)

Item	Navy	Air Force	Army	DMA	DLA	DIS	Total
My QC leader lost interest	60.00	62.50	50.00	.00	46.15	.00	49.42
Turnover in top management	35.00	37.50	.00	100.00	30.76	.00	26.57
Turnover in key personnel in QC program	5.00	50.00	6.25	100.00	38.46	.00	25.42
No champion for QC program	42.50	50.00	6.25	.00	55.76	.00	37.57

Table 28

Obstacles to Quality Circle (QC) Program Success Not Overcome as Perceived by Program Coordinators (%)

Obstacle	Navy	Air Force	Army	DMA[a]	DLA[a]	DIS	Total
Lack of own command support	22.50	25.00	6.25	.00	38.25	.00	23.71
My management is not supportive	52.50	62.50	37.50	.00	67.30	.00	52.71
Lack of support from headquarters	20.00	50.00	.00	.00	46.15	.00	27.42
Job doesn't allow for regular meetings	20.00	62.50	25.00	100.00	36.53	.00	33.85
Supervisor doesn't let members go to meetings	50.00	75.00	12.50	.00	57.69	100.00	47.14
Management not interested in worker participation	65.00	62.50	50.00	.00	59.61	.00	55.57
QCs ran out of problems	.00	12.50	25.00	.00	1.92	.00	7.85
Management expects too much too soon	55.00	62.00	25.00	.00	44.23	.00	41.85
Lack of support from union	15.00	12.50	.00	.00	9.61	.00	8.42
Employees lose interest	42.50	87.50	37.50	.00	67.30	100.00	56.14
Competition from other involvement programs	15.00	25.00	18.75	.00	13.46	.00	15.57
Not enough facilitators for our QC	12.00	25.00	31.25	.00	67.30	.00	37.85
Management did not implement my QC's ideas	35.00	62.50	62.50	.00	59.61	.00	51.57
QC employees don't know enough	2.50	12.50	25.00	.00	7.69	.00	10.57
Lack of support from non-QC members	25.00	87.50	37.50	.00	55.76	.00	45.00
Problems not at QC level	15.00	25.00	12.50	.00	15.38	.00	14.85
Lack of job security for QC members	17.50	12.50	31.25	.00	11.52	.00	16.85
Lack of trust in supervisor-subordinate relations	52.50	62.50	62.50	.00	65.38	100.00	60.57
No improvement for management to see	32.50	87.50	12.50	.00	40.38	.00	35.28
Lack of member training	2.50	.00	.00	.00	28.84	.00	11.28
No sign of dollar savings	25.00	75.00	12.50	.00	48.07	.00	35.00

[a]Only one program coordinator responded for these departments.

Table 29

Quality Circle Program Effectiveness at Achieving Goals as Perceived by Program Coordinators

Goal	Navy	Air Force	Army	DMA	DLA	DIS
1. Greater productivity	E	E	E	BE	E	E
2. Improved product or service quality	E	E	E	BE	E	E
3. Improved processes or procedures	E	E	E	E	E	VE
4. Improved worker satisfaction	BE	BE	E	BE	E	E
5. Improved upward communication	E	I	E	BE	BE	E
6. Reduced turnover, absenteeism	E	BE	BE	I	I	I
7. Increased work force involvement	E	BE	E	BE	BE	E
8. Improved employee analytic skills	E	BE	E	E	BE	E
9. Increased employee participation in decision making	E	BE	E	BE	BE	E
10. Improved trust in management	BE	BE	BE	BE	BE	BE
11. Improved work group communication	E	E	E	E	E	BE
12. Improved work group morale	E	BE	E	E	BE	BE
13. Improved QWL	E	E	E	BE	E	BE

Note. The following scale was used: VE = Very effective; E = Effective; BE = Barely effective; I = Ineffective; VI = Very ineffective.

Table 30

Program Coordinator Responses to the Question, "Are cost/benefit records maintained for your organization's QC program?"

Response	Navy	Air Force	Army	DMA	DLA	DIS
Yes	.62	.25	1.00	1.00	.21	1.00
No, program too small, too new	.25	.00	.00	.00	.21	.00
No, suggestions not conducive to C/B analysis	.12	.50	.00	.00	.17	.00
No, no one qualified	.00	.00	.00	.00	.00	.00
No, not required by command	.25	.00	.00	.00	.21	.00
No, not required by headquarters	.12	.00	.00	.00	.23	.00
No, C/B is not part of QC philosophy	.00	.25	.00	.00	.00	.00
No, not enough people to do reporting	.12	.25	.00	.00	.07	.00

Note. Scale values were 1 = Yes, 0 = No. Columns may sum to more than 100.

Table 31

Percentage of Solutions Implemented (Reported by Members)

Measure	Navy	Air Force	Army	DMA	DLA	DIS	Total
Mean	72.11	62.23	67.49	76.42	68.40	70.49	68.08
SD	24.94	24.33	22.69	18.29	20.47	19.50	22.65

Table 32

Level of Goal Achievement
(Reported by Members)

Goal		Navy	Air Force	Army	DMA	DLA	DIS	Mean
1. Greater productivity	Mean	2.58	2.37	2.45	2.72	2.86	2.25	2.56
	SD	.58	.61	.64	.63	.74	.46	.67
2. Improved product or service quality	Mean	2.48	2.40	2.41	2.55	2.83	2.18	2.52
	SD	.59	.59	.64	.50	.72	.56	.66
3. Improved processes or procedures	Mean	2.42	2.30	2.36	2.25	2.62	2.03	2.41
	SD	.57	.52	.63	.42	.68	.54	.62
4. Improved worker satisfaction	Mean	2.72	2.44	2.57	2.77	2.89	2.34	2.65
	SD	.67	.53	.68	.63	.74	.54	.69
5. Improved upward communication	Mean	2.64	2.45	2.58	2.50	2.81	2.29	2.62
	SD	.69	.65	.70	.54	.69	.53	.69
6. Reduced turnover, absenteeism	Mean	3.54	3.28	3.16	3.66	3.64	3.41	3.37
	SD	.68	.69	.73	.50	.66	.52	.72
7. Increased work force involvement	Mean	2.85	2.54	2.64	2.69	2.95	2.54	2.73
	SD	.64	.61	.66	.67	.75	.36	.68
8. Improved employee analytic skills	Mean	2.68	2.48	2.63	2.96	2.99	2.63	2.72
	SD	.64	.60	.59	.51	.74	.55	.66
9. Increased employee participation in decision making	Mean	2.78	2.46	2.60	2.64	2.96	2.39	2.69
	SD	.68	.69	.61	.58	.70	.55	.67
10. Trust in management	Mean	3.21	3.12	3.20	3.39	3.39	2.93	3.24
	SD	.71	.59	.71	.56	.68	.39	.68
Total	Mean	2.79	2.58	2.66	2.81	2.99	2.49	2.75
	SD	.64	.61	.65	.55	.71	.50	.67

Note. The following scale values were used: 1 = Very effective; 2 = Effective; 3 = Barely effective; 4 = Ineffective; 5 = Very ineffective.

Table 33

Correlation of Members' Desire to Join a Quality Circle with Percentage of Solutions Implemented and with Goal Achievement

Measure		Navy	Air Force	Army	DMA	DLA	DIS
Percent of solutions implemented	n	71	64	199	17	119	10
	r	.07	-.02	.08	-.19	-.01	.05
	p	.25	.42	.12	.22	.43	.43
Goal achievement	n	73	64	207	17	117	10
	r	.23	.24	.28	.13	.14	-.16
	p	.02	.02	.001	.30	.05	.32

Note. For outcome measures listed here and in other tables, the following information is included:

1. n = the number of circles contributing data to the analysis.
2. r = the nature of the relationship between the two variables.
3. p = the probability that the observed relationship is purely chance.

Table 34

Correlation of Level of Management Support with Percentage of Solutions Implemented and with Goal Achievement

Measure		Navy	Air Force	Army	DMA	DLA	DIS
Percent of solutions implemented	n	71	64	198	17	118	10
	r	.10	.19	.22	.12	.30	.00
	p	.184	.06	.001	.31	.001	.49
Goal achievement	n	73	64	206	17	117	10
	r	.47	.23	.58	.24	.54	.67
	p	.001	.02	.001	.16	.001	.01

Table 35

Correlation of Problems Existing at the Shop Level with the Percentage of Solutions Implemented and with Goal Achievement

Measure		Navy	Air Force	Army	DMA	DLA	DIS
Percent of solutions implemented	n	71	64	197	17	118	10
	r	.13	-.20	.09	-.08	.26	.51
	p	.139	.05	.09	.36	.002	.06
Goal achievement	n	73	64	205	17	117	10
	r	.46	.47	.40	.01	.47	.66
	p	.001	.001	.001	.48	.001	.01

Table 36

Correlation of the Degree of Organizational Trust and Stability with Percentage of Solutions Implemented and with Goal Achievement

Measure		Navy	Air Force	Army	DMA	DLA	DIS
Percent of solutions implemented	n	71	64	198	17	118	10
	r	.21	.005	.12	.16	.19	.08
	p	.039	.48	.04	.27	.01	.41
Goal achievement	n	73	64	206	17	117	10
	r	.44	.32	.44	.11	.48	.52
	p	.001	.005	.001	.33	.001	.05

Table 37

Correlation of Adequacy of Supervisory and Management Training with Percentage of Solutions Implemented and with Goal Achievement

Measure		Navy	Air Force	Army	DMA[a]	DLA	DIS
Percent of solutions implemented	n	46	24	141	--	65	6
	r	.28	.21	.12	--	.10	.15
	p	.02	.15	.07	--	.20	.38
Goal achievement	n	47	24	147	--	64	6
	r	.27	.37	.01	--	.27	.45
	p	.03	.03	.42	--	.01	.18

[a]So few supervisory questionnaires were received from DMA quality control organizations that it rendered correlational analysis unreliable.

Table 38

Correlation of Degree of Democratic Interaction with
Percentage of Solutions Implemented and with Goal Achievement

Measure		Navy	Air Force	Army	DMA	DLA	DIS
Percent of solutions implemented	n	71	64	199	17	119	10
	r	.30	-.22	.09	.31	-.01	-.31
	p	.005	.04	.09	.11	.45	.19
Goal achievement	n	73	64	207	17	117	10
	r	.19	.10	.26	-.15	.29	.24
	p	.05	.20	.001	.27	.001	.24

Table 39

Correlation of Degree of Consensus-based Group Decision Making with
Percentage of Solutions Implemented and with Goal Achievement

Measure		Navy	Air Force	Army	DMA	DLA	DIS
Percent of solutions implemented	n	71	64	199	17	119	10
	r	-.35	.18	-.11	-.15	.04	.35
	p	.001	.07	.06	.27	.31	.16
Goal achievement	n	73	64	207	17	117	10
	r	.25	.36	.30	.10	.31	.22
	p	.01	.001	.001	.34	.001	.26

Table 40

Correlation of Meeting Regularity with
Percentage of Solutions Implemented and with Goal Achievement

Measure		Navy	Air Force	Army	DMA	DLA	DIS
Percent of solutions implemented	n	71	64	199	17	119	10
	r	-.21	.20	-.07	.13	-.01	-.45
	p	.03	.05	.13	30	.42	.09
Goal achievement	n	73	64	207	17	117	10
	r	.27	.49	.46	.02	.51	.83
	p	.009	.001	.001	.46	.001	.001

Table 41

Correlation of Sufficient Information to Work on Problems with Percentage of Solutions Implemented and with Goal Achievement

Measure		Navy	Air Force	Army	DMA	DLA	DIS
Percent of solutions implemented	n	68	62	196	17	117	10
	r	.02	-.14	-.03	.05	-.13	-.19
	p	.41	.13	.32	.41	.06	.29
Goal achievement	n	70	62	204	17	117	10
	r	.17	.00	.28	.32	.33	.49
	p	.095	.48	.001	.10	.001	.07

Table 42

Correlation of the Degree to which the Quality Circle Program Goals Support the Organizational Goals with Percentage of Solutions Implemented and with Goal Achievement

Measure		Navy	Air Force	Army	DMA	DLA	DIS
Percent of solutions implemented	n	71	64	199	17	118	10
	r	.16	.20	.16	.15	.14	.05
	p	.08	.05	.01	.28	.06	.43
Goal achievement	n	73	64	207	17	117	10
	r	.50	.54	.54	.10	.42	.71
	p	.001	.001	.001	.34	.001	.01

Table 43

Correlation of Degree of Management's Concern over Power Infringement with Percent of Solutions Implemented and with Goal Achievement

Measure		Navy	Air Force	Army	DMA	DLA	DIS
Percent of solutions implemented	n	71	64	199	17	119	10
	r	.11	.00	.10	.26	.33	.19
	p	.17	.48	.06	.14	.001	.29
Goal achievement	n	73	64	207	17	117	10
	r	.57	.25	.49	.07	.45	.77
	p	.001	.01	.001	.39	.001	.005

Table 44

Correlation of Monetary Rewards with the Percentage of Solutions Implemented and with Goal Achievement

Measure		Navy	Air Force	Army	DMA	DLA	DIS
Percent of solutions implemented	n	71	64	199	17	118	10
	r	.00	.01	.19	.17	.11	.29
	p	.48	.46	.003	.24	.10	.20
Goal achievement	n	73	64	207	17	116	10
	r	.09	.10	.29	.38	.41	.34
	p	.21	.19	.00	.06	.00	.16

Table 45

Correlation of Turnover in Key Personnel with Percentage of Solutions Implemented and with Goal Achievement

Measure		Navy	Air Force	Army	DMA	DLA	DIS
Percent of solutions implemented	n	71	64	198	17	118	10
	r	.38	.00	.10	.26	.15	.61
	p	.001	.50	.06	.15	.04	.02
Goal achievement	r	73	64	206	17	117	10
	r	.48	.13	.39	.26	.58	.66
	p	.001	.15	.001	.15	.001	.01

Table 46

Correlation of Demonstration of Cost Savings with Percentage of Solutions Implemented and with Goal Achievement

Measure		Navy	Air Force	Army	DMA	DLA	DIS
Percent of solutions implemented	n	71	64	198	17	118	10
	r	.07	.12	-.18	.30	-.27	.10
	p	.26	.15	.005	.11	.002	.39
Goal achievement	n	73	64	206	17	117	10
	r	.34	.20	.48	.21	.41	.55
	p	.001	.05	.001	.19	.001	.04

Table 47

Location of Quality Circle Programs
(%)

Area	Navy	Air Force	Army	DMA	DLA	DIS
Engineering	6	--	--	--	--	--
Plans/Programs	--	50	14	--	34	--
CO	6	--	14	--	6	--
Production	38	--	--	--	--	100
Personnel	6	--	--	--	--	--
Productivity programs office	6	50	29	100	--	--
Comptroller	--	--	14	--	60	--
Other	38	--	29	--	--	--

Table 48

Correlation of Degree of Quality Circle Integration with the Percentage of Solutions Implemented and with Goal Achievement

Measure		Navy	Air Force	Army	DMA	DLA	DIS
Percent of solutions implemented	n	71	64	199	17	119	10
	r	.03	.03	.19	-.08	.21	.55
	p	.37	.38	.003	.37	.01	.05
Goal achievement	n	73	64	207	17	117	10
	r	.56	.39	.63	.11	.62	.86
	p	.001	.001	.001	.33	.001	.001

Table 49

Number of Circles and Length of Time Each Has Been Active

Length of Time Active	Number of Circles[a]	Percentage
Less than 6 months	55	11.3
6 months to 1 year	96	19.8
1 to 2 years	155	32.0
2 to 3 years	106	21.9
3 years or longer	73	15.1

[a]Quality circles did not provide this information.

Table 50

Correlation of Quality Circle Age with Percentage of Solutions Implemented and with Goal Achievement

Measure		Navy	Air Force	Army	DMA	DLA[a]	DIS[a]
Percent of solutions implemented	n	70	64	199	17	--	--
	r	-.15	-.11	.03	.02	--	--
	p	.09	.18	.32	.46	--	--
Goal achievement	n	72	64	207	17	--	--
	r	.01	.13	.07	.40	--	--
	p	.44	.13	.13	.05	--	--

[a]There were too few quality circles to perform this statistic.

Table 51

Tests of Hypotheses for Percentage of Solutions Implemented and Degree of Goal Achievement for All Organizations

Hypothesis		Solutions Implemented	Goals Achieved
1.	Desire of workers to participate	-	**
2.	Management interested in worker participation	**	**
3.	Problems located at shop level	-	**
4.	Organizational trust and stability as well as union support	**	**
5.	Degree of management training	**	-
6.	Democratic group interactions	-	**
7.	Regularity of QC meetings	-	**
8.	Sufficient information available to workers	-	**
9.	QC goals consonant with organizational goals	**	**
10.	Concern with infringement of power	**	**
11.	Monetary rewards	-	**
12.	Turnover of QC personnel	**	**
13.	Cost savings shown	**	**
14.	QC program integration	**	**
15.	Age of QCs	**	-

Note. "**" represents a statistically significant result ($p < .05$).

REFERENCES

Atwater, L., & Sander, S. (August 1984). Quality circles (QCs) in Navy organizations: An evaluation (NPRDC Tech. Rep. 84-53). San Diego: Navy Personnel Research and Development Center.

Aubler, A., & Overholt, M. (1982). Are quality circles right for your company? Personnel Journal, 61, 829-831.

Bean, A., Ordowich, A., & Westley, W. (Winter 1985-86). Including the supervisor in employee involvement programs. National Productivity Review, 5, 64-67.

Beardsley, J., & Dewar, D. (1977). Quality circles. San Jose, CA: J. F. Beardsley & Associates.

Bell, J. D., & Kerr. D. L. (January 1987). Measuring training results: Key to managerial commitment. Training and Development Journal, 41, 70-73.

Ben-Ami, R. Quality circles in the Federal Government. (1985). Chapter to appear in Merit Systems Protection Board's forthcoming report on Employee involvement systems in the Federal Government.

Berger, R. W. (1986). Avoiding problems in developing quality circles. In R. W. Berger & D. L. Shores (Eds.), Quality circles: Selected readings. New York: Marcel Dekker, Inc., ASQC Quality Press.

Blair, J. D., & Whitehead, C. J. (September-October 1984). Can quality circles survive in the United States? Business Horizons, 27, 17-23.

Brockner, J., & Hess, T. (1986). Self-esteem and task performance in quality circles. Academy of Management Journal, 29, 617-623.

Brooke, K. (1986). QC circles' success depends on management readiness to support workers' involvement. In R. W. Berger & D. L. Shores (Eds.), Quality circles: Selected readings. New York: Marcel Dekker, Inc., ASQC Quality Press.

Cole, R. E. (May-June 1985). Target information for competitive performance. Harvard Business Review, 63, 100-109.

Cole, R., & Tachiki, D. (Autumn 1984). Forging institutional links: Making quality circles work in the U.S. National Productivity Review, 3, 417-429.

Crawford, F. L. (February 1983). Quality circles results measurement in the Federal sector (Rep. No. 83-480A). Maxwell AFB, AL: Air Command and Staff College, Air University (ATC).

Dean, J. W. (1985). The decision to participate in quality circles. Journal of Applied Behavioral Science, 21, 317-327.

Deming, W. E. (1944). Some principles of the Shewhart methods of quality control. Mechanical Engineering, 66(3), 173-177.

Deming, W. E. (Winter 1981-82). Improvement of quality and productivity through action by management. National Productivity Review, 1, 12-22.

Ferris, G., & Wagner, J. A. (1985). Quality circles in the United States: A conceptual reevaluation. The Journal of Applied Behavioral Science, 21, 155-167.

Gerber, B. (December 1986). Quality circles: The second generation. Training, 23, 54-61.

Hackman, J., & Oldham, G. (1980). Work redesign. Reading, MA: Addison-Wesley.

Hulin, C. L., & Blood, M. R. (1968). Job enlargement, individual differences, and worker responses. Psychological Bulletin, 69, 41-65.

Imberman, W. (1982). Why quality circles don't work. Canadian Business, 20(11), 24-27.

Juran, J. M. (Ed.). (1962). Quality control handbook (3rd ed.). New York: McGraw-Hill.

Kalton, G. (1983). An introduction to survey sampling. Beverly Hills, CA: Sage Publications.

Kanter, R. M. (1983). Dilemmas of managing participation. Organizational Dynamics, 12, 5-27.

Klein, G. (1986). Employee-centered productivity and QWL programs: Findings from an area study. National Productivity Review, 5, 348-362.

Krieger, H. L. (January 1981). Use of quality control circles in the Federal Government (Ltr. Rept. B-201646). Washington, DC: U.S. General Accounting Office.

Kushell, E. (Spring 1986). Profitability: The key to successful involvement programs. SAM Advanced Management Journal, 22-25.

Lawler, E. E. (1971). Pay and organizational effectiveness. New York: McGraw-Hill.

Lawler, E., & Mohrman, S. A. (January-February 1985). Quality circles after the fad. Harvard Business Review, 63, 64-71.

Locke, E., & Schweiger, D. (1979). Participation in decision making: One more look. Research in Organizational Behavior, 1, 265-339.

Metz, E. (1984). Managing change: Implementing productivity and quality improvements. National Productivity Review, 3(3), 303-314.

Meyer, G. W., & Scott, R. G. (1985). Quality circles: Panacea or Pandora's box? Organizational Dynamics, 14, 34-50.

Miner, J. B. (1980). Theories of organizational behavior. Hinsdale, IL: Dryden Press.

Mohrman, S., & Ledford, G. (1985). The design and use of effective employee participation groups: Implications for human resources management. Human Resources Management, 24, 413-428.

Munchus, G. (1983). Employer-employee based quality circles in Japan: Human resource policy implications for American firms. Academy of Management Review, 8, 255-261.

Rieker, W. S. (June 1984). QC circles as quality motivators: Status in the United States. Proceedings of the World Quality Congress, Brighton, England. London: British Quality Association.

Ross, T. L., & Ross, R. A. (July 1986). Dana's Hyco plant successfully integrates quality circles and gainsharing (Reports on Significant Literature and Events, No. 7). Washington, DC: Department of Labor.

Sashkin, M. (Spring 1984). Participative management is an ethical imperative. Organizational Dynamics, 13, 5-22.

Seeyle, H., & Sween, J. (1982). QC in industry: Survey results. The Quality Circle Journal, 5(4), 26-29.

Steel, R., Mento, A., Dilla, B., Ovalle, N., & Lloyd, R. (1985). Factors influencing the success and failure of two quality circle programs. Journal of Management, 11, 99-119.

Steel, R. P., & Shane, G. (1986). Evaluation research on quality circles: Technical and analytical implications. Human Relations, 39, 449-468.

Vroom, V., & Yetton, P. (1973). Leadership and decision making. Pittsburgh, PA: University of Pittsburgh Press.

Warwick, D. P., & Lininger, C. A. (1975). The sample survey: Theory and practice. New York: McGraw Hill.

Werther, W. B. (1986). Quality circles and corporate culture. In R. W. Berger & D. L. Shores (Eds.), Quality circles: Selected readings. New York: Marcel Dekker, Inc., ASQC Quality Press.

White, D., & Bednar, D. (1984-85). Locating problems with quality circles. National Productivity Review, 4, 45-52.

Wood, R., Hull, F., & Azumi, K. (1983). Evaluating quality circles: The American application. California Management Review, 26(1), 37-53.

APPENDIX A

TELEPHONE INTERVIEW

TELEPHONE INTERVIEW

The following questions were designed to gather initial information over the telephone about quality circle programs in the various DoD activities. A list of these activities was provided by the productivity principals from each branch of the military. The purpose of the telephone interview was to provide a more detailed list of the locations where quality circles were most active. These questions were addressed to the local activity's quality circle program coordinator.

Name of Organization _____

Location _____

Point of Contact and Telephone # _____

1. How many people work at the activity? _____

2. What employee involvement programs does your organization have? List:

3. How long have quality circles or employee involvement programs been in existence?

4. What was the reason for starting the quality circle program?

5. How many circles are currently meeting?

6. How many employees are involved in circles?

7. How active would you rate the quality circle program?

8. Where do you see the program going in the future?

9. What contributions do you think your program makes to the overall effectiveness of the organization?

10. Does your organization require documentation and/or management reviews?

11. Where does responsibility for overseeing circle activities lie? Technical departments (engineering, quality assurance, productivity) or non-technical (personnel, human resources, education, training)?

12. At what levels in the organization (blue vs. white collars) are the quality circle participants?

APPENDIX B

QUALITY CIRCLE MEMBER QUESTIONNAIRE, INCLUDING GENERAL GUIDELINES FOR ADMINISTRATION, COLLECTION, AND RETURN OF ALL QUESTIONNAIRE TYPES

HUMAN FACTORS & ORGANIZATIONAL SYSTEMS LABORATORY
NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER
SAN DIEGO, CALIFORNIA 92152-6800

The questionnaires in this package were designed by researchers at the Navy Personnel Research and Development Center for the Defense Productivity Program Office. The questionnaires were developed to determine the conditions under which Quality Circles work best. We want to know from those involved in QC programs what they think and feel about their experience with QCs. You will be asked about the possible positive outcomes of QCs and the potential obstacles in the success of Quality Circles.

We believe this study will provide valuable information concerning the various ways QCs are used and supported throughout the Department of Defense, as well as the pitfalls to be avoided and conditions necessary for QC success. Your assistance in this project is greatly needed if we are to accomplish this goal. The final copy of the report will be distributed to all participating organizations as well as any others interested in the findings. Your input will be greatly appreciated and treated as confidential.

If you have any questions concerning the administration of these questionnaires please call either Michael White (AV 933-6935) or Paula Konoske (AV 933-2191) at the Navy Personnel Research and Development Center, San Diego, CA. With your help, we believe that this project will provide valuable insight into the most successful approaches and circumstances necessary for QC success.

GUIDELINES FOR QUESTIONNAIRE ADMINISTRATION, COLLECTION AND RETURN

1. You have received four different types of questionnaires:
   - 1a. One questionnaire was designed for QC members (yellow cover sheet);
   - 1b. One questionnaire was designed for first level supervisors (green cover sheet);
   - 1c. One questionnaire was designed for managers at levels in the organization higher than that of the first level of supervision (blue cover sheet);
   - 1d. One questionnaire designed for the QC program coordinator (white cover sheet).

2. The questionnaires with the yellow and those with the green cover sheets are to be filled out by QC members and their first level supervisor, respectively. These questionnaires have been grouped into packages of 8 member and 2 supervisor questionnaires each, along with their return envelopes. One of these packages should go to each QC in your organization, both active and inactive. We are asking that, when possible, all QC members and their supervisors fill out the questionnaire that was designed for them. If you have any QCs with more than 8 members, randomly choose the 8 members who will receive the QC member questionnaire. Supervisors who are also QC members should fill out the supervisory questionnaire only.

The questionnaires with the blue cover sheets are for managers with employees actually in QCs, but who are at levels higher than the first level of supervision. The managers who fill out this questionnaire should be ones that are involved in authorizing the start of a new QC, authorizing a QC idea, and those involved in the implementation of authorized QC suggestions. We have included one manager questionnaire for every 5 QCs in your organization.

The questionnaire with the white cover sheet is labeled "Quality Circle Program Coordinator Questionnaire", your program may not have a position known as the QC Program Coordinator. This questionnaire should be filled out by the person(s) in the QC program who is most directly responsible for administering your organization's QC program. Five of this type of questionnaire have been included in the case that more than one person fulfills this function.

3. Envelopes addressed to the Navy Personnel Research and Development Center (NPRDC) were also included in the package sent to you. We are performing the actual analysis and writing the results of the study for Defense Productivity Program Office (DPPO). DPPO will never see your organization's actual responses or even a summary of these responses. The information your organization provides us will be aggregated to the department, service, or agency level (e.g., Army, DLA, DIS level).

Please make sure that each potential respondent (QC member, supervisor, manager, coordinator) receives an envelope along with his/her questionnaire. Completed questionnaires should be sealed in the envelopes provided and forwarded to NPRDC within 2 weeks.

4. A follow-up reminder from the program coordinator to all respondents (e.g., a memo) concerning the completion of the questionnaire may be necessary if we are to get enough respondents from your organization. A memo about a week after the distribution of the questionnaire and envelopes should provide all respondents with enough time to complete the questionnaire and yet serve as good reminder to those who have not yet responded. Representatives of NPRDC will contact you during the last week of January, 1987 for an update of the status of the questionnaire administration.

The information provided by your QCs members, their supervisors, managers, and coordinator(s) cannot be obtained from anyone else. You are the QC experts. The NPRDC, QC research team wishes to again thank you and all those who will cooperate with us in this important project.

Paula Konoske (AV 933-2191)
Mike White (AV 933-6935)
NPRDC, San Diego, CA
92152

HUMAN FACTORS & ORGANIZATIONAL SYSTEMS LABORATORY
NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER
SAN DIEGO CALIFORNIA 92152

Quali.y Circles Member Questionnaire

The Navy Personnel Research and Development Center (NPRDC) has been asked by the Department of Defense to assist them in obtaining your attitudes toward quality circles and the quality circle program. Your organization has been randomly selected by NPRDC to participate in this survey. There are no right or wrong answers, we are just interested in your feelings about each of the areas covered. Be sure to answer all the questions. For those questions you are not sure of, mark the answer that is closest to the way you feel. Your responses to these items will be combined with those of other people taking the survey, and no one outside of the NPRDC research staff will be aware of any individual's repsonses or individual organization's aggregate responses. Information coming from this survey will be examined by service (e.g., Navy, DLA). No information concerning individuals or individual organizations will be presented.

After completing the survey, please seal it in the attached envelop and send to NAVPERSRANDCEN. Thank you for your participation.

Paula Konoske
Mike White
Code 42
Navy Personnel Research and Development Center
Telephone: A/V 933-2191

Privacy Act Statement

Public Law 95-579 called the Privacy Act of 1974 requires that you be informed of the purposes and uses to be made of the information collected.

Name of Organization _____

Name of Department of Directorate _____

Please answer each question by circling the letter next to the most appropriate response or by using the space provided to record the letter of your response.

1. Sex: a. Male b. Female

2. Education (Please indicate highest level of education)
   a. Less than high school degree
   b. Graduated from high school
   c. Some college or technical training beyond high school (less than a BA degree)
   d. Graduated from college (BA, BS, or other bachelor's degree)
   e. Some graduate work
   f. Graduate degree (M.A, M.S., or other)

3. Age
   a. 20 years of age or younger
   b. 21 to 30 years of age
   c. 31 to 40 years of age
   d. 41 to 50 years of age
   e. 51 to 60 years of age
   f. 61 years of age or older

4. How long have you been a member of this activity? _____mos/yrs.

5. How long have you been a member of the QCs program?
   a. less than 6 months
   b. 6 months to a year
   c. 1 to 2 years
   d. 2 to 3 years
   e. 3 years or more

6. How long has it been since your last QC meeting?
   a. One week
   b. Two weeks
   c. One month
   d. Two months
   e. Longer than two months

7. From the list presented below, please circle your reasons for joining a QC. (Please circle as many responses as apply)

a. I thought QCs might solve some problems and make my job easier

b. I wanted a chance to solve a work related problem

c. I wanted to get the training in problem-solving techniques

d. I thought my supervisor wanted me to volunteer

e. I wanted to find out what QCs were all about

f. I wanted to have an hour off my regular work

g. I wanted my supervisor to recognize my initiative

h. I thought it would look good on my record

i. I thought volunteering would lead to a promotion or pay raise

j. I wanted a chance to express my ideas

k. I wanted a chance to be recognized by management

l. I was directed by my supervisor to volunteer

8. To what extent have you received adequate training in the following areas?

1. To a very large extent
2. To a large extent
3. To some extent
4. To a little extent
5. To a very little extent

____a. Problem-Solving Techniques

____b. QC Tools

____c. Training in purposes of QC

____d. Training for how to make presentations

____e. Training for tracking and determining cost savings of QC suggestions

____f. Other, specify_____

9. If you are currently a member of a circle, how long has the circle been active?

a. less than 6 months

b. 6 months to a year

c. 1 to 2 years

d. 2 to 3 years

e. 3 years or longer

10. How much time, on the average, does it take you to perform your QC related tasks?

_____hrs/week

11. How much time are you provided to perform QC related tasks?

_____hrs/week

12. To what extent do you think the problems in the organization can be solved at the worker (shop floor) level?

a. To a very large extent
b. To a large extent
c. To some extent
d. To a little extent
e. To a very little extent

13. Please use the following scale to rate how effectively your QC activities have been in achieving each of the following goals (a-k) for your organization.

1 = Very effective
2 = Effective
3 = Barely effective
4 = Ineffective
5 = Very ineffective

____a. Greater productivity
____b. Improved product or service quality
____c. Improved processes or procedures
____d. Improved worker satisfaction
____e. Improved communication up the chain
____f. Reduced turnover or absenteeism
____g. Increased involvement by the workforce
____h. Improved employee analytical skills
____i. Greater employee participation in decision making
____j. Improved employee trust in management
____k. Other, please specify:_____

14. For the following list, please rank the ways problems are selected for the QC groups to work on. Put a number 1 by the most frequent way problems are selected and 2 by the next most frequent and so on.

_____a. Manager selects
_____b. QC members select
_____c. QC Program Coordinator Selects
_____d. QC leader selects
_____e. Top management selects
_____f. QC Facilitator selects

15. Rank the following types of problems most frequently (1=most frequently to 5= least frequently) worked on:

_____a. Problems with the physical environment

_____b. Quality problems with the product or service

_____c. Problems with inefficient processes or procedures

_____d. Productivity problems

_____e. Safety problems

16. Since becoming a member of the QC program, how many *suggestions* for improvement has your QC group presented to management?

_____number of suggestions presented to management

17. Since becoming a member of QCs, how many suggestions that you made have actually been *implemented?*

_____number of solutions implemented

18. In your experience with QCs, what specific problems have you addressed? List

a._____

b._____

c._____

d._____

19. How often have you worked on problems outside of your own work area?

a. Always

b. Usually

c. Sometimes

d. Rarely

e. Never (if you chose this option go to item 21)

20. When working on problems out of your work area, are the information and/or people you need available to solve the problems?

a. Always

b. Usually

c. Sometimes

d. Rarely

e. Never

21. How often does a QC program coordinator/facilitator attend your group meetings?

a. Always
b. Usually
c. Sometimes
d. Rarely
e. Never

22. How often does your department/directorate head or steering group member attend your QC meetings?

a. Always
b. Usually
c. Sometimes
d. Rarely
e. Never

23. How was the leader of your QC selected? (Choose one only)

a. the supervisor is also the leader
b. the leader was appointed by a supervisor
c. the QC program coordinator selected the leader
d. the facilitator selected the leader
e. the leader volunteered
a. the group voted
e. the group leadership is rotated so all members get a chance to be leaders
h. other, specify _____

24. To what extent is the interaction in the group democratic?

a. To a very large extent
b. To a large extent
c. To some extent
d. To a little extent
e. To a very little extent

25. To what extent are the decisions made in the group based on group consensus (agreement)?

a. To a very large extent
b. To a large extent
c. To some extent
d. To a little extent
e. To a very little extent

26. To what extent does your organization operate in an uncertain (don't know what will happen next) environment?

a. To a very large extent
b. To a large extent
c. To some extent
d. To a little extent
e. To a very little extent

27. How would you describe your organization as a whole? (Please circle one option only).

a. Very friendly atmosphere
b. Friendly atmosphere
c. Neither friendly nor unfriendly atmosphere
d. Unfriendly atmosphere
e. Very unfriendly atmosphere

28. Would you say that management in your organization is flexible when it comes to trying new things? (Please circle one option only)

a. Yes, very flexible
b. Yes, rather flexible
c. Neither flexible nor inflexible
d. No, rather inflexible
e. No, very inflexible

29. Please use the following scale to describe your supervisor's management style when dealing with you. (Please circle one response only)

a. Very participative
b. Somewhat participative
c. About midway between participative and directive
d. Directive
e. Very directive

30. In general, how well does management in your organization respond to ideas from the workforce.

a. Extremely well
b. Quite well
c. Fairly well
d. Poorly
e. Very poorly

31. The following are potential obstacles to QCs' success. Using the following scale show the extent to which each of these obstacles (a-z) has been a problem for your QC's success.

1 = Hasn't been an obstacle
2 = Has been an obstacle that we have overcome
3 = Has been an obstacle that we have not overcome

_____a. Employees losing interes:
_____b. Management did not implement my QCs ideas
_____c. My QC leader lost interest
_____d. Lack of our command support
_____e. No signs of dollar savings from our QC
_____f. Turnover in top management
_____g. Turnover in key personnel in the QC program
_____h. Competition with other employee involvement programs
_____i. Not enough facilitators for our QC
_____j. My fellow QC members don't know enough to solve problems
_____k. Problems are not at our QC level
_____l. My management is not supportive
_____m. No more problems for my QC to solve
_____n. My supervisor does not let members go to circle meetings
_____o. No signs of improvement to convince management to keep QCs
_____p. Lack of job security for our QC members
_____q. Lack of support from headquarters
_____r. Lack of QC member training for my group
_____s. Management not interested in worker participation
_____t. My job does not allow for regular QC meetings
_____u. My management expected too much, too soon
_____v. Problems involved more than just my own work group
_____w. No "champion" for QC program
_____x. Lack of support from labor organizations
_____y. Lack of support from non-QC employees
_____z. Lack of trust in supervisor-subordinate relationships
_____ Others, please specify_____

32. Please use the following scale to indicate the extent to which the QC program has had an effect on the following aspects of your job? (Please evaluate each item listed)

1 = Increased
2 = No Change
3 = Decreased

_____a. Time available to do my regular job
_____b. The complexity of my work
_____c. The amount of supervision I receive
_____d. The amount of information I receive
_____e. The amount of participative management in my area
_____f. The number of responsibilities in my job
_____g. My influence over day to day operations
_____h. My own credibility with management
_____i. The amount of trust between myself and my supervisor
_____j. Other, please specify _____

33. What kind of recognition for solving problems does your QC receive? (Please circle as many responses as apply)

a. Recognized in QC newsletters
b. Recognized in activity's newspapers
c. Recognized by management presentations
d. Recognized by non-monetary awards (plaques, certificates, etc.)
e. Recognized by monetary awards
f. No recognition for our group
g. Other, specify _____

34. To what extent does the QC program support the goals of the organization?

a. To a very large extent
b. To a large extent
c. To some extent
d. To a little extent
e. To a very little extent

35. Overall, how well do you think your organization is structured to support the QCs.? (Please circle one option)

a. Not at all

b. Not so well

c. Fairly well

d. Very well

e. Perfectly

36. Please use the following scale to show the extent to which your management has supported the QC program with each of the following resources.

1. To a very large extent
2. To a large extent
3. To some extent
4. To a little extent
5. To a very little extent

____a. Money

____b. Training

____c. Facilitators

____d. Members' time

____e. Recognition

____f. Personnel development

____g. Solution implementation

____h. Verbal support

37. To what extent has your union supported the QC program?

a. To a very large extent

b. To a large extent

c. To some extent

d. To a little extent

e. No union

APPENDIX C

QUALITY CIRCLE PROGRAM COORDINATOR QUESTIONNAIRE

HUMAN FACTORS & ORGANIZATIONAL SYSTEMS LABORATORY
NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER
SAN DIEGO, CALIFORNIA 92152

Quality Circles Program Coordinator Questionnaire

The Navy Personnel Research and Development Center (NPRDC) has been asked by the Department of Defense to assist them in obtaining your attitudes toward quality circles and the quality circle program. Your organization has been randomly selected by NPRDC to participate in this survey. There are no right or wrong answers, we are just interested in your feelings about each of the areas covered. Be sure to answer all the questions. For those questions you are not sure of, mark the answer that is closest to the way you feel. Your responses to these items will be combined with those of other people taking the survey, and no one outside of the NPRDC research staff will be aware of any individual's repsonses or individual organization's aggregate responses. Information coming from this survey will be examined by service (e.g., Navy, DLA). No information concerning individuals or individual organizations will be presented.

After completing the survey, please seal it in the attached envelop and send to NAVPERSRANDCEN. Thank you for your participation.

Paula Konoske
Mike White
Code 42
Navy Personnel Research and Development Center
Telephone: A/V 933-2191

Privacy Act Statement

Public Law 95-579 called the Privacy Act of 1974 requires that you be informed of the purposes and uses to be made of the information collected.

Name of Organization _____

Name of Department of Directorate _____

Please answer each question by circling the letter next to the most appropriate response or by using the space provided to record the letter of your response.

1. Sex: a. Male b. Female

2. Education (Please indicate highest level of education)

   a. Less than high school degree
   b. Graduated from high school
   c. Some college or technical training beyond high school (less than a BA degree)
   d. Graduated from college (BA, BS, or other bachelor's degree)
   e. Some graduate work
   f. Graduate degree (M.A, M.S., or other)

3. Age

   a. 20 years of age or younger
   b. 21 to 30 years of age
   c. 31 to 40 years of age
   d. 41 to 50 years of age
   e. 51 to 60 years of age
   f. 61 years of age or older

4. How long have you worked at this activity? _____mos/yrs.

5. How long has your organization had a QC program? _____mos/yrs.

6. How long have you been coordinator of the QC program?

   a. less than 6 months
   b. 6 months to a year
   c. 1 to 2 years
   d. 2 to 3 years
   e. 3 years or longer

7. How many people work at your organization? _____

8. How many active QCs do you have? _____

9. The following are reasons for deciding to implement a Quality Circles program. Please order them in terms of the degree of impact each has had in your organization's decision to implement QCs. Put a 1 by the reason that had the greatest impact, a 2 by the reason having the next greatest impact and so on.

_____a. Headquarters directed
_____b. Improve productivity
_____c. Improve quality of product or service
_____d. Improve communication and coordination
_____e. Improve employee morale
_____f. Command directed
_____g. Increased employee involvement

10. Please rate the current status of your QC program (Please circle one response only)

a. QC program has been moved to other Quality and Productivity Programs
b. QC program continues to expand and grow
c. QC program not expanding but is stable
d. QC program activity is decreasing
e. QC program served its purpose here, but presently does not exist
f. QC program never served purpose and does not exist

11. If you answered (a) to the above question, specify the program that encompassed QCs.

12. Is participation as program coordinator considered to be collateral duty?

a. Yes
b. No

13. Please list the training packages used for training QC members.

a._____
b._____
c._____
d._____

14. Why do you think members volunteer for QC activities? (Circle as many of the following as apply).

a. They want a chance to solve a work-related problem
b. They want training in problem-solving techniques
c. They want a chance to express their ideas
d. They want to find out what QCs were all about
e. They want an hour off their regular work
f. They want their supervisor to recognize their initiative
g. They think it would look good on their record
h. They think volunteering will lead to a promotion or pay raise
i. They think their supervisor wanted them to volunteer
j. They want a chance to be recognized by management

15. As Quality Circle program coordinator, what are your duties in the QC program? (Circle as many of the following as apply)

a. Attend all management presentations
b. Suggest problems for QCs to work on
c. Implement QC suggestions
d. Start new circles
e. Train QC members and managers
f. Collect cost/benefit data
g. Monitor and follow-up on implementation of circle suggestions
h. Attend QC meetings
i. Other, please specify:

16. In what department or directorate is the QC program coordinator located?

a. Engineering
b. Planning and programs
c. Commanding officer
d. Production
e. Personnel
f. Productivity program office
g. Education and training
h. Quality assurance
i. Comptroller
j. Other (Name) _____

17. List other programs besides Quality Circles for which you are responsible.

1. _____
2. _____
3. _____

18. How much time, on the average, does it take you to perform your QC related tasks?

_____hrs/week

19. How much time are you provided to perform QC related tasks?

_____hrs/week

20. Do you have a steering committee for "managing" the QC program?

a. Yes
b. No (if you chose this option, please go directly to item 22)

21. Please describe the composition of the members of the steering committee (their levels in organization and the departments/directorates they belong -- list union representatives and command level people).

22. Check the ways problems are identified for QCs to work on. (Please circle as many as apply)

a. Shop level employees identify problems for themselves
b. First line manager identifies problems
c. Top management identifies problems
d. Steering committee identifies problems
e. Program coordinator identifies problems
f. Other, specify _____

23. From the following list, please check the people who can initiate the forming of QCs. (Please circle as many as apply)

a. Shop level employees
b. First line manager
c. Top level manager
d. Steering committee
e. Program coordinator
f. Other, please specify:

24. To what extent has the QC program become a way of doing business in your organization?

a. To a very great extent--QCs are completely integrated in all areas
b. To some extent--QCs have been integrated in select functional areas
c. To some extent--QCs have been partially integrated in all areas
d. Not at all--QCs have not been integrated in any area

25. Please list any guidelines or instructions that support the on-going QC program. (Topic of guideline and serial number of instruction, if available)

a. _____
b. _____
c. _____ _____

26. Did middle and top management receive training regarding the QC program

a. Yes
b. No (if you chose this option, please go directly to item 28)

27. If yes, what type of training did your managers receive?

a. Training concerning what QCs could do for your organization
b. Training concerning manager responsibilities in the QC program
c. Other, please specify:

28. Using the following scale, rate how often QCs work on problems from the following areas.

1 = Always
2 = Usually
3 = Sometimes
4 = Rarely
5 = Never

____a. Problems at one shop and within one department or directorate
____b. Problems across shops and within one department or directorate
____c. Problems at management level and within one department or directorate
____d. Problems at management level and across department or directorates

29. Please use the following scale to rate how effective your QC program has been in achieving each of the following goals (a-n) for your organization.

1 = Very effective
2 = Effective
3 = Barely effective
4 = Ineffective
5 = Very ineffective

____a. Improved productivity
____b. Improved quality of product or services
____c. Improved processes or procedures
____d. Improved worker satisfaction
____e. Improved communication up the chain
____f. Reduced turnover or absenteeism
____g. Increased involvement by the workforce
____h. Improved employee analytical skills
____i. Greater employee participation in decision making
____j. Improved employee trust in management
____k. Improved work group communication
____l. Improved work group morale
____m. Improved quality of work life
____n. Other, please specify:_____

30. For the following list, please rate how often problems are selected for the QC groups to work on.

a. Always
b. Usually
c. Sometimes
d. Rarely
e. Never

_____a. Manager selects
_____b. QC members select
_____c. QC program coordinator selects
_____d. QC leader selects
_____e. Top management selects
_____f. QC facilitator selects

31. Rank the following types of problems most frequently worked on (1=most frequently to 5= least frequently):

_____a. Problems concerning satisfaction with the physical environment

_____b. Quality problems with the product or service

_____c. Problems with inefficient processes or procedures

_____d. Productivity problems

_____e. Safety problems

_____f. Other, please, specify_____

32. Since the beginning of the Quality Circles program, how many *suggestions* for improvement have been made to management?

_____number of suggestions made to management

33. Since the beginning of the Quality Circles program, how many suggestions made by circles have actually been *implemented?*

_____number of solutions implemented

34. How often are problems outside of a work area addressed?

a. Always

b. Very frequently

c. Frequently

c. Not very frequently

d. Never (if you chose this option, go directly to item 36)

35. Are the information and/or people you need available to solve the problems?

a. Always

b. Usually

c. Sometimes

d. Rarely

e. Never

36. Do you have any QCs composed of members from different departments or directorates?

a. Yes

b. No

37. Do you have any QCs composed of managers from either the same or different departments or directorates?

a. Yes
b. No

38. How often do you, the program coordinator, facilitator, or steering committee member attend the meetings of the QC groups?

a. Always
b. Usually
c. Sometimes
d. Rarely
e. Never

39. How often do department/directorate heads attend the meetings of the QC group?

a. Always
b. Usually
c. Sometimes
d. Rarely
e. Never

40. How are the leaders of your QCs selected?

a. The supervisor is also the leader
b. The leader is appointed by a supervisor
c. The QC program coordinator selects the leader
d. The facilitator is the leader
e. The leader volunteers
f. The group votes
g. The group leadership is rotated so all members get a chance to be leaders
h. Other .

41. How often are work area supervisors also members of the QC in that area?

a. Always
b. Usually
c. Sometimes
d. Rarely
e. Never

42. To what extent does your organization operate in an uncertain (i.e. unstable, ambiguous, changing, unpredictable) environment?

a. To a very large extent
b. To a large extent
c. To some extent
d. To a little extent
e. To a very little extent

43. Would you say that management in your organization is flexible when dealing with the external environment? (Please circle one option only)

a. Yes, very flexible
b. Yes, rather flexible
c. Neither flexible nor inflexible
d. No, rather inflexible
e. No, very inflexible

44. How would you describe the organization as a whole? (Please circle one option only)

a. Very friendly atmosphere
b. Friendly atmosphere
c. Neither friendly nor unfriendly atmosphere
d. Unfriendly atmosphere
e. Very unfriendly atmosphere

45. Please use the following scale to describe your supervisor's degree of support.

a. Very supportive
b. Somewhat supportive
c. Not supportive at all

46. In general, how well does management in your organization respond to ideas from the workforce?

a. Extremely well
b. Quite well
c. Fairly well
d. Poorly
e. Very poorly

47. The following are potential obstacles to QC success? Use the following scale to show the extent to which each of these obstacles (a-z) has been a problem for your QC program.

1 = Hasn't been an obstacle
2 = Has been an obstacle that we have overcome
3 = Has been an obstacle that we have not overcome

_____a. Employees losing interest
_____b. Management not implementing QC ideas
_____c. QC leaders losing interest
_____d. Lack of local command support
_____e. No signs of dollar savings
_____f. Turnover in top management
_____g. Turnover in key personnel in the QC program
_____h. Competition with other employee involvement programs
_____i. Not enough facilitators
_____j. QC members don't know enough to solve problems
_____k. Problems are not at QC level
_____l. Management is not supportive
_____m. No more problems for QCs to solve
_____n. Supervisors not letting members go to circle meetings
_____o. No signs of improvement to convince management to keep circles
_____p. Lack of job security for members
_____q. Lack of support from Headquarters
_____r. Lack of QC member training
_____s. Management not interested in worker participation
_____t. The job does not allow for regular QC meetings
_____u. Management expected too much, too soon
_____v. Problems involve more than one work group
_____w. No "champion" for QC program
_____x. Lack of support from labor union
_____y. Lack of support from non-QC employees
_____z. Lack of trust in supervisor-subordinate relationships
_____ Others, please specify_____

48. What kind of recognition for solving problems do your QC members receive? (Please circle as many as apply)

a. Recognized in QC newsletter

b. Recognized in activity's newspaper

c. Recognized by management presentations

d. Recognized by non-monetary awards (plaques, certificates, etc.)

e. Recognized by monetary awards

f. No recognition of the group

g. Other, specify_____

49. Rank the frequency of the following ways of justifying the Quality Circles Program to Management. (1 = most often used, 2 = next most frequently used and so on).

_____a. improved employee morale

_____b. actual cost savings

_____c. program helps identify work-related problems

_____d. other

50. To what extent has turnover in military management had a detrimental effect on the achievement of QC program goals?

a. To a very large extent

b. To a large extent

c. To some extent

d. To a little extent

e. To a very little extent

51. Please use the following scale to show the extent to which your management has supported the QC program with each of the following resources.

1 = To a very large extent

2 = To a large extent

3 = To some extent

4 = To a little extent

5 = To a very little extent

_____a. Money

_____b. Training

_____c. Facilitators

_____d. Members' time

_____e. Recognition

_____f. Personnel development

_____g. Solution implementation

_____h. Verbal support

52. To what extent has your union supported the QC program?

a. A large extent
b. To some extent
c. A little extent
d. No union

53. To what extent does the QC program reflect the goals of your organization? (Please circle as many as apply)

a. To a very large extent
b. To a large extent
c. To some extent
d. To a little extent
e. To a very little extent

54. Overall, how well do you think your organization is structured to support the QC program? (Please check one option only)

a. Not at all
b. Not so well
c. Fairly well
d. Very well
e. Perfectly

55. To look at what happens over the life of a QC program, please estimate the number of circles that were active for each year of the program.

Year	Number of Circles
First year	_____
Second year	_____
Third year	_____
Fourth year	_____
Fifth year	_____
	_____
	_____

56. Are you required to supply QC program information to individuals outside of your own organization.

a. Yes
b. No

57. If you answered yes to the above question, list the individuals and their organizations

58. To what extent do you agree with higher commands requesting QC program information?

a. I agree and would comply
b. I agree but would not be able to comply
c. I disagree but would comply
d. I disagree and would not be able to comply

59. Are cost benefit records maintained for your organization's QC program?

a. Yes (Please go on the the next page of the questionnaire)
b. No, our program is too young and/or too small to warrant such an analysis
c. No, the suggestions our circles come up with are not conducive to strict cost/benefit analysis
d. No, there is really no one here qualified to do cost/benefit analysis
e. No, we are not required to do so by our local command
f. No, we are not required to do so from our headquarters
g. No, cost/benefit analysis runs counter to the basic QC philosophy
h. No, we don't have enough people to perform reporting

If you answered "No" to the above question, please go to page 17 and answer question number 12.

SUMMARY OF COSTS AND BENEFITS

Please answer the following information about your organization.

1. Name of your organization: _____

2. Number of employees: _____

3. Location (city and state): _____

Please answer the following questions about your organization's Quality Circles (QC) program.

4. How long has your organization had a QC program? _____yrs.

5. What are the total costs of your organization's QC program (Cumulative to date) in dollars?
$ _____

6. Do the dollar costs described above cover all the years your organization has had a QC program?

   a. Yes

   b. No (please, explain):

7. From the list presented below, please check as many of the sub-costs that are included in the cost figure described above. (Please circle as many as apply)

   a. Overhead time spent in direct support of the QC program (e.g., training costs, labor costs for facilitator/coordinator).

   b. QC member labor hours expended on QC meetings

   c. Costs to implement suggestions

   d. Costs to monitor and follow-up on implementation

   e. Other costs; please specify:

8. How were the costs described above determined?

a. Documentation collected over the years the program has been in operation.
b. Computation based on knowledge of regular program costs.
c. Estimate
d. Other, please specify:

9. What is the ratio of dollar benefits to dollar costs of your organization's QC program? (Please check one of the options below)

a. Less than 1 to 1
b. $3 in benefits for every $1 dollar in costs
c. $4 in benefits for every $1 dollar in costs
d. $5 in benefits for every $1 dollar in costs
e. $6 in benefits for every $1 dollar in costs
f. $7 in benefits for every $1 dollar in costs
g. $8 in benefits for every $1 dollar in costs
h. $9 in benefits for every $1 dollar in costs
i. $10 in benefits for every $1 dollar in costs
j. Greater than $10 in benefits for every $1 in costs, please specify:

$ _____in benefits for every $1 dollar in costs

10. How are the QC program dollar benefits described above determined in your organization?

a. Estimates made by the QC members from their analysis of the problem
b. Analysis through the beneficial suggestion program
c. Analysis through the comptroller's office
d. Analysis by engineering, standards, or productivity personnel
e. Analysis by outside auditor
f. Other, please specify:

11. What percent of the costs of the QC program are paid out of department/directorate budgets?
_____%

12. What are the intangible benefits of your organization's QC program? Please list as many as you can.

a.

b.

c.

d.

e.

f.

g.

h.

i.

j.

k.

l.

m.

APPENDIX D

QUALITY CIRCLE SUPERVISOR QUESTIONNAIRE

HUMAN FACTORS & ORGANIZATIONAL SYSTEMS LABORATORY
NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER
SAN DIEGO, CALIFORNIA 92152

Quality Circles Supervisor Questionnaire

The Navy Personnel Research and Development Center (NPRDC) has been asked by the Department of Defense to assist them in obtaining your attitudes toward quality circles and the quality circle program. Your organization has been randomly selected by NPRDC to participate in this survey. There are no right or wrong answers, we are just interested in your feelings about each of the areas covered. Be sure to answer all the questions. For those questions you are not sure of, mark the answer that is closest to the way you feel. Your responses to these items will be combined with those of other people taking the survey, and no one outside of the NPRDC research staff will be aware of any individual's repsonses or individual organization's aggregate responses. Information coming from this survey will be examined by service (e.g., Navy, DLA). No information concerning individuals or individual organizations will be presented.

After completing the survey, please seal it in the attached envelop and send to NAVPERSRANDCEN. Thank you for your participation.

Paula Konoske
Mike White
Code 42
Navy Personnel Research and Development Center
Telephone: A/V 933-2191

Privacy Act Statement

Public Law 95-579 called the Privacy Act of 1974 requires that you be informed of the purposes and uses to be made of the information collected.

Your organization's name: _____

Your department/directorate: _____

Please answer each question by circling the letter next to your response or by using the space provided to record your response.

1. Sex: a. Male b. Female

2. Education (Please indicate your highest level of education):

   a. Less than high school degree
   b. Graduated from high school
   c. Some college or technical training beyond high school (less than a BA degree)
   d. Graduated from college (BA, BS, or other bachelor's degree)
   e. Some graduate school
   f. Graduate degree (M.A., M.S. or other)

3. Age:

   a. 20 years of age or younger
   b: 21 to 30 years of age
   c. 31 to 40 years of age
   d. 41 to 50 years of age
   e. 51 to 60 years of age
   f. 61 years or older

4. How long have you been in your present position?

   a. less than 6 months
   b. six months to a year
   c. more than 1 year but less than 2 years
   d. more than 2 year but less than 3 years
   e. 3 years or longer

5. How long have you been a supervisor of employees who are members of Quality Circles?

   a. less than 6 months
   b. six months to a year
   c. more than 1 year but less than 2 years
   d. more than 2 year but less than 3 years
   e. 3 years or longer

6. (a) How many of the people that you supervise, directly or indirectly, are quality circles members ? _____

   (b) How many different Quality Circles do these employees represent? _____

   (c) How many of these circles are currently meeting regularly? _____

7. Please rate the current status of your QC(s). (Please circle one response only)

a. All of my QCs are active
b. Some of my QCs are active and some are inactive
c. All of my QCs are inactive

8. Please indicate the reason for your deciding to start your QC(s) (Please circle as many responses as apply)

a. I did not start the QC(s); the QC(s) were in place when I got this job
b. I thought that the QC(s) might solve some work related problems
c. I wanted my workers trained at solving work related problems
d. I thought that my superiors wanted me to start the QC(s)
e. I wanted to find out what QCs were all about
f. I thought that I would be recognized by my superiors if I started the QC(s)
g. I thought that starting the QC(s) would look good on my record
h. I wanted to give my workers a chance to express their ideas
i. I was directed to start the QC(s) by my supervisor

10. As a supervisor in this organization, have you received any training concerning the purpose of quality circles? (Please circle 1 option only)

a. no
b. yes, but it was not adequate to my needs
c. yes, and it was adequate to my needs

11. As a supervisor in this organization, have you received any training concerning your responsibilities in the quality circles program? (Please circle one option only)

a. no
b. yes, but it was not adequate to my needs
c. yes, and it was adequate to my needs

12. As a supervisor, what do you see as your duties in the quality circles program? (Please circle as many responses as apply)

a. Attend all management presentations which involve my QC(s)
b. Suggest problems for the QC(s) to work on
c. Screen all problems the QC(s) wish to work on so that they are acceptable to management
d. Implement reasonable QC suggestions that are within my authority
e. Provide the time the QC(s) need to work on their problems
f. Participate in the solution of QC problems on an as-needed basis
g. Be a member in a supervisor QC
h. Support the start of new QCs
i. Monitor or follow up on the implementation of QC approved solutions
j. Attend QC meetings
k. Support QCs that work on problems outside their own work area
l. Participate as a member of the QC steering group
m. Other (Please specify): _____

13. To what extent have you used your QC(s) as a standard way for your people to improve quality or productivity goals? (Please circle one option only)

a. To a very great extent-- the QC(s) are the way we accomplish these goals
b. To some extent-- the QC(s) are the way we accomplish these goals in certain areas only
c. Not at all-- the QC(s) are not the way we accomplish these goals

14. From the list below, please select the reasons you think your employees join QCs. (Please circle as many responses as apply)

a. They want to solve work related problems
b. They want to get training in solving problems
c. They want a chance to express their ideas
d. They want to find out what QCs are all about
e. They want a hour off their regular work each week
f. They want to be recognized by their supervisor
g. They think that it will look good on their record
h. They think participating will lead to promotion
i. They want a chance to be recognized by upper management
j. They were directed to do so by their supervisor
k. Other (Please specify):_____

_____

15. How much time, on the average, does it take you to perform your QC related tasks each week? _____ hrs/week

16. How much time are you provided to perform QC related tasks each week? _____ hrs/week

17. What kind of recognition for solving problems does your QC(s) receive? (Please circle as many responses as apply)

a. Recognized in QC newsletter
b. Recognized in Activity's newsletter
c. Recognized in management presentations
d. Recognized by their immediate supervisor
e. Recognized by non-monetary rewards (plaques, certificates, etc.)
f. Recognized by monetary rewards
g. No recognition of the group
h. Other (Please specify):_____

_____

18. How often do you attend QC meetings? (Please circle one option only)

a. Always
b. Usually
c. Sometimes
d. Rarely
e. Never

19. To what extent does your organization operate in an uncertain (i.e., unstable, ambiguous, changing, unpredictable) environment? (Please circle one option only)

a. To a very large extent
b. To a large extent
c. To some extent
d. To a little extent
e. To a very little extent

20. Please use the following scale to show the extent to which your management has supported your QC(s) with <u>each</u> of the following resources.

1= To a very large extent
2= To a large extent
3= To some extent
4= To a little extent
5= To a very little extent

_____a. Money
_____b. Training
_____c. Facilitators
_____d. Members' time
_____e. Recognition
_____f. Personnel development
_____g. Solution implementation
_____h. Verbal support

21. Please use the following scale to describe your own management style when dealing with your subordinates. (Please circle one response only)

a. Very participative
b. Somewhat participative
c. About midway between participative and directive
d. Directive
e. Very directive

22. Please use the following scale to describe your supervisor's management style when dealing with you. (Please circle 1 response only)

a. Very participative
b. Somewhat participative
c. About midway between participative and directive
d. Directive
e. Very directive

23. In general, how well does management in your organization respond to ideas from the work force? (Please circle one response only)

a. Extremely well
b. Quite well
c. Fairly well
d. Poorly
e. Very poorly

24. Please use the following scale to rate how effective your QC(s) have been in achieving each of the following goals (a-n) for your organization.

1= Very effective
2= Effective
3= Barely effective
4= Ineffective
5= Very ineffective

_____a. Improved productivity
_____b. Improved quality of product or services
_____c. Improved processes or procedures
_____d. Improved worker satisfaction
_____e. Improved communication up the chain of command
_____f. Reduced turnover or absenteeism
_____g. Increased involvement by work force
_____h. Improvement in employee analytical skills
_____i. Greater employee participation in decision making
_____j. Improved employee trust in the management
_____k. Improved work group cooperation
_____l. Improved work group morale
_____m. Improved worker quality of working life
_____n. Other, please specify: _____

25. To what extent do the problems worked on by your QC(s) reflect the goals of your organization? (Please circle one response only)

a. To a very large extent
b. To a large extent
c. To some extent
d. To a little extent
e. To a very little extent

26. Please use the following scale to indicate the extent to which your QC(s) have had an effect on the following aspects of your job. (Please evaluate each item (a-j) listed.)

1= Increase
2= No change
3= Decrease

_____a. Time available to do my regular job
_____b. The complexity of my work
_____c. The amount of supervision I have to perform
_____d. The amount of information I receive
_____e. The amount of participative management
_____f. The number of responsibilities in my job
_____g. My influence over the day to day operation
_____h. My credibility with management
_____i. The amount of trust between myself and my subordinates
_____j. Other (Please specify): _____
_____

27. How many suggestions for improvement has your QC(s) made to you or higher management levels? _____

28. How many of these suggestions for improvement have been implemented? _____

29. The following are potential obstacles to Quality circles' success. Please use the following scale to show the extent to which each of these potential obstacles (a-z) has been a problem to your quality circle(s).

1. Hasn't been an obstacle
2. Has been an obstacle that we have overcome
3. Has been an obstacle that we have not overcome

_____a. Employees losing interest
_____b. Management not implementing quality circles ideas
_____c. QC leaders losing interest
_____d. Lack of local command support
_____e. No signs of dollar savings
_____f. Turnover in top management
_____g. Turnover in key personnel in the QC program
_____h. Competition with other employee involvement programs
_____i. Not enough facilitators
_____j. QC members don't know enough to solve problems
_____k. Problems are not at quality circles level
_____l. Management is not supportive
_____m. The QC(s) simply ran out of problems they could solve
_____n. Not being able to let members go to QC meetings
_____o. No signs of improvement to convince management to keep circles
_____p. Lack of job security for members
_____q. Lack of support from Headquarters
_____r. Lack of QC member training
_____s. Management isn't interested in worker participation
_____t. The job does not allow for regular QC meetings
_____u. Management expected too much, too soon
_____v. The problems involve more than one work group
_____w. There is no "champion" for the QC program here
_____x. Lack of support from labor union
_____y. Lack of support from non-QC employees
_____z. Lack of trust in supervisor-subordinate relationships
_____ Other: _____

30. How would you describe your organization as a whole? (Please circle 1 response only)

a. Very friendly atmosphere
b. Friendly atmosphere
c. Neither friendly nor unfriendly atmosphere
d. Unfriendly atmosphere
e. Very unfriendly atmosphere

31. Would you say that the management in your organization is flexible when it comes to trying new things? (Please circle one response only)

a. Yes, very flexible
b. Yes, rather flexible
c. Neither flexible nor inflexible
d. No, rather inflexible
e. No, very inflexible

32. About how many hours per week is a QC member allowed to perform QC related tasks?
_____ hrs/QC member

33. Are you required to provide information about your QC(s) to others in your organization?

a. No (Please go directly to item 35)
b. Yes

34. If you answered yes to item 33, please specify below the types of information you are required to provide and how often you are required to provide it.

Type of Information	Frequency This Information Is Required
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

35. To what extent do you agree with the idea and would comply with others in your organization requesting QC information from you?

a. I agree and would comply
b. I agree but would not be able to comply
c. I disagree but would comply
d. I disagree and would not be able to comply

36. Using the scale below please show the extent to which your QC(s) work on each of the following problems. (Please evaluate each item (a-f) in the list below.)

1= To an very large extent
2= To a large extent
3= To some extent
4= To a little extent
5= To a very little extent

_____a. Quality of work-life problems
_____b. Quality problems with products or services
_____c. Ineffective processes and procedures
_____d. Productivity problems
_____e. Safety problems
_____f. Other, please specify:_____

37. What percent of the problems that your QC(s) work on are conducive to cost benefit analysis? _____%

38. Overall, how well do you think your organization is structured to support the QC program? (Please circle one response only)

a. Not at all
b. Not so well
c. Fairly well
d. Very well
e. Perfectly

39. Does management have authority to reject any QC idea? (Please circle one response only)

a. Yes
b. No, management can reject QC ideas only with justification.
c. No, management cannot reject QC ideas

40. How often is management updated concerning the projects and progress your QCs are working on? (Please circle one response only)

a. Management is not updated at all
b. Management is updated occasionally
c. Management is updated frequently enough so that they usually know what is going on
d. Other, please specify: _____

APPENDIX E

QUALITY CIRCLE MANAGER QUESTIONNAIRE

HUMAN FACTORS & ORGANIZATIONAL SYSTEMS LABORATORY
NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER
SAN DIEGO, CALIFORNIA 92152

Quality Circles Manager Questionnaire

The Navy Personnel Research and Development Center (NPRDC) has been asked by the Department of Defense to assist them in obtaining your attitudes toward quality circles and the quality circle program. Your organization has been randomly selected by NPRDC to participate in this survey. There are no right or wrong answers, we are just interested in your feelings about each of the areas covered. Be sure to answer all the questions. For those questions you are not sure of, mark the answer that is closest to the way you feel. Your responses to these items will be combined with those of other people taking the survey, and no one outside of the NPRDC research staff will be aware of any individual's repsonses or individual organization's aggregate responses. Information coming from this survey will be examined by service (e.g., Navy, DLA). No information concerning individuals or individual organizations will be presented.

After completing the survey, please seal it in the attached envelop and send to NAVPERSRANDCEN. Thank you for your participation.

Paula Konoske
Mike White
Code 42
Navy Personnel Research and Development Center
Telephone: A/V 933-2191

Privacy Act Statement

Public Law 95-579 called the Privacy Act of 1974 requires that you be informed of the purposes and uses to be made of the information collected.

Your organization's name: _____

Your department/directorate: _____

Please answer each question by circling the letter next to your response or by using the space provided to record your response.

1. Sex: a. Male b. Female

2. Education (Please indicate your highest level of education):

   a. Less than high school degree
   b. Graduated from high school
   c. Some college or technical training beyond high school (less than a BA degree)
   d. Graduated from college (BA, BS, or other bachelor's degree)
   e. Some graduate school
   f. Graduate degree (M.A., M.S. or other)

3. Age:

   a. 20 years of age or younger
   b. 21 to 30 years of age
   c. 31 to 40 years of age
   d. 41 to 50 years of age
   e. 51 to 60 years of age
   f. 61 to years or older

4. How long have you been in your present position?

   a. less than 6 months
   b. six months to a year
   c. more than 1 year but less than 2 years
   d. more than 2 year but less than 3 years
   e. 3 years or longer

5. How long have you been a manager with a Quality Circles program?

   a. less than 6 months
   b. six months to a year
   c. more than 1 year but less than 2 years
   d. more than 2 year but less than 3 years
   e. 3 years or longer

6. (a) How many of the people that you supervise, directly or indirectly, are quality circles members ? _____

   (b) How many different Quality Circles do these employees represent? _____

   (c) How many of these circles are currently meeting regularly? _____

7. Please rate the current status of your QCs. (Please circle one response only)

a. QC program has been moved to other Quality or Productivity programs
b. QC program continues to expand and grow
c. QC program is not expanding but is stable
d. QC program activity is decreasing
e. QC program has served its purpose here, but presently does not exist
f. QC program never served a purpose here and does not exist

8. Please indicate the reason for your deciding to implement QCs (Please circle as many responses as apply)

a. I did not implement QCs; they were in place when I got this job
b. I thought that QCs might solve some work related problems
c. I wanted my workers trained at solving work related problems
d. I thought that my superiors wanted me to implement QCs
e. I wanted to find out what QCs were all about
f. I thought that I would be recognized by my superiors if I implemented QCs
g. I thought that implementing QCs would look good on my record
h. I wanted to give my workers a chance to express their ideas
i. I was directed to implement QCs by my supervisor

10. Since you became a manager in this organization, have you received any training concerning the purpose of quality circles? (Please circle 1 option only)

a. no
b. yes, but it was not adequate to my needs
c. yes, and it was adequate to my needs

11. Since you became a manager in this organization, have you received any training concerning your responsibilities in the quality circles program? (Please circle one option only)

a. no
b. yes, but it was not adequate to my needs
c. yes, and it was adequate to my needs

12. As a manager, what do you see as your duties in the quality circles program? (Please circle as many responses as apply)

a. Attend all management presentations which involve any of my QCs
b. Suggest problems for the QCs to work on
c. Screen all problems QCs wish to work on so that they are acceptable to management
d. Implement reasonable QC suggestions that are within my authority
e. Provide the time QCs need to work on their problems
f. Participate in the solution of QC problems on an as-needed basis
g. Be a member in a manager QC
h. Support the start of new QCs
i. Monitor or follow up on the implementation of QC approved solutions
j. Attend QC meetings
k. Support QCs that work on problems outside their own work area
l. Participate as a member of the QC steering group
m. Other (Please specify): _____

13. To what extent have your QCs become a standard way for your people to improve quality or productivity? (Please circle one option only)

a. To a very great extent-- QCs are completely integrated in the way we do business here
b. To some extent-- QCs have been integrated with the way we do business in certain areas only
c. To some extent-- QCs have been partially integrated with the way we do business here
d. Not at all-- QCs have not at all been integrated with the way we do business here

14. From the list below, please select the reasons you think your employees join QCs. (Please circle as many responses as apply)

a. They want to solve work related problems
b. They want to get training in solving problems
c. They want a chance to express their ideas
d. They want to find out what QCs are all about
e. They want a hour off their regular work each week
f. They want to be recognized by their supervisor
g. They think that it will look good on their record
h. They think participating will lead to promotion
i. They want a chance to be recognized by upper management
j. They were directed to do so by their supervisor
k. Other (Please specify):_____

_____

15. How much time, on the average, does it take you to perform your QC related tasks each week? _____ hrs/week

16. How much time are you provided to perform QC related tasks each week? _____ hrs/week

17. What kind of recognition for solving problems does your QCs receive? (Please circle as many responses as apply)

a. Recognized in QC newsletter
b. Recognized in Activity's newsletter
c. Recognized in management presentations
d. Recognized by non-monetary rewards (plaques, certificates, etc.)
e. Recognized by monetary rewards
f. No recognition of the group
g. Other (Please specify):_____

_____

18. How often do you attend QC meetings? (Please circle one option only)

a. Always
b. Usually
c. Sometimes
d. Rarely
e. Never

19. To what extent does your organization operate in an uncertain (i.e., unstable, ambiguous, changing, unpredictable) environment? (Please circle one option only)

1= To a very large extent
2= To a large extent
3= To some extent
4= To a little extent
5= To a very little extent

20. Please use the following scale to show the extent to which your management has supported your QCs with <u>each</u> of the following resources.

1= To a very large extent
2= To a large extent
3= To some extent
4= To a little extent
5= To a very little extent

_____a. Money
_____b. Training
_____c. Facilitators
_____d. Members' time
_____e. Recognition
_____f. Personnel development
_____g. Solution implementation
_____h. Verbal support

21. Please use the following scale to describe your own management style when dealing with your subordinates. (Please circle one response only)

a. Very participative
b. Somewhat participative
c. About midway between participative and directive
d. Directive
e. Very directive

22. Please use the following scale to describe your supervisor's management style when dealing with you. (Please circle 1 response only)

a. Very participative
b. Somewhat participative
c. About midway between participative and directive
d. Directive
e. Very directive

23. In general, how well does management in your organization respond to ideas from the work force? (Please circle one response only)

a. Extremely well
b. Quite well
c. Fairly well
d. Poorly
e. Very poorly

24. Please use the following scale to rate how effective QCs have been in achieving each of the following goals (a-n) for your organization.

1= Very effective
2= Effective
3= Barely effective
4= Ineffective
5= Very ineffective

_____a. Improved productivity
_____b. Improved quality of product or services
_____c. Improved processes or procedures
_____d. Improved worker satisfaction
_____e. Improved communication up the chain of command
_____f. Reduced turnover or absenteeism
_____g. Increased involvement by work force
_____h. Improvement in employee analytical skills
_____i. Greater employee participation in decision making
_____j. Improved employee trust in the management
_____k. Improved work group cooperation
_____l. Improved work group morale
_____m. Improved worker quality of working life
_____n. Other, please specify: _____

25. To what extent do the problems worked on by your QCs reflect the goals of your organization? (Please circle one response only)

a. To a very large extent
b. To a large extent
c. To some extent
d. To a little extent
e. To a very little extent

26. Please use the following scale to indicate the extent to which your QCs have had an effect on the following aspects of your job. (Please evaluate each item (a-j) listed.)

1= Increase
2= No effect
3= Decrease

_____a. Time available to do my regular job
_____b. The complexity of my work
_____c. The amount of supervision I have to perform
_____d. The amount of information I receive
_____e. The amount of participative management
_____f. The number of responsibilities in my job
_____g. My influence over the day to day operation
_____h. My credibility with management
_____i. The amount of trust between myself and my subordinates
_____j. Other (Please specify): _____
_____

27. How many suggestions for improvement has your QCs made to management? _____

28. How many of these suggestions for improvement have been implemented? _____

29. The following are potential obstacles to Quality circles' success. Please use the following scale to show the extent to which each of these potential obstacles (a-z) has been a problem to your quality circles.

1. Hasn't been an obstacle
2. Has been an obstacle that we have overcome
3. Has been an obstacle that we have not overcome

_____a. Employees losing interest
_____b. Management not implementing quality circles ideas
_____c. QC leaders losing interest
_____d. Lack of local command support
_____e. No signs of dollar savings
_____f. Turnover in top management
_____g. Turnover in key personnel in the QC program
_____h. Competition with other employee involvement programs
_____i. Not enough facilitators
_____j. QC members don't know enough to solve problems
_____k. Problems are not at quality circles level
_____l. Management is not supportive
_____m. The QCs simply ran out of problems they could solve
_____n. Supervisors not letting members go to QC meetings
_____o. No signs of improvement to convince management to keep circles
_____p. Lack of job security for members
_____q. Lack of support from Headquarters
_____r. Lack of QC member training
_____s. Management isn't interested in worker participation
_____t. The job does not allow for regular QC meetings
_____u. Management expected too much, too soon
_____v. The problems involve more than one work group
_____w. There is no "champion" for the QC program here
_____x. Lack of support from labor union
_____y. Lack of support from non-QC employees
_____z. Lack of trust in supervisor-subordinate relationships
_____ Other: _____

30. How would you describe your organization as a whole? (Please circle 1 response only)

a. Very friendly atmosphere
b. Friendly atmosphere
c. Neither friendly nor unfriendly atmosphere
d. Unfriendly atmosphere
e. Very unfriendly atmosphere

31. Would you say that the management in your organization is flexible when it comes to trying new things? (Please circle one response only)

a. Yes, very flexible
b. Yes, rather flexible
c. Neither flexible nor inflexible
d. No, rather inflexible
e. No, very inflexible

32. About how many hours per week is a QC member allowed to perform QC related tasks?
_____ hrs/QC member

33. Are you required to provide information about your QCs to others in your organization?

a. No (Please go directly to item 35)
b. Yes

34. If you answered yes to item 33, please specify below the types of information you are required to provide and how often you are required to provide it.

Type of Information	Frequency This Information Is Required
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

35. To what extent to do you agree with the idea and would comply with others in your organization requesting QC information from you?

a. I agree and would comply
b. I agree but would not be able to comply
c. I disagree but would comply
d. I disagree and would not be able to comply

36. Using the scale below please show the extent to which your QCs work on each of the following problems. (Please evaluate each item (a-f) in the list below.)

1= To an very large extent
2= To a large extent
3= To some extent
4= To a little extent
5= To a very little extent

_____a. Quality of work-life problems
_____b. Quality problems with products or services
_____c. Ineffective processes and procedures
_____d. Productivity problems
_____e. Safety problems
_____f. Other, please specify:_____

37. What percent of the problems that your QCs work on are conducive to cost benefit analysis? _____%

38. Overall, how well do you think your organization is structured to support the QC program? (Please circle one response only)

a. Not at all
b. Not so well
c. Fairly well
d. Very well
e. Perfectly

39. Does management have authority to reject any QC idea? (Please circle one response only)

a. Yes
b. No, management can reject QC ideas only with justification.
c. No, management cannot reject QC ideas

40. How often is management updated concerning the projects and progress QCs are working on? (Please circle one response only)

a. Management is not updated at all
b. Management is updated, but not frequently enough
c. Management is updated frequently enough so that they usually know what is going on

APPENDIX F

DoD LETTER

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
DEFENSE PRODUCTIVITY PROGRAM OFFICE
TWO SKYLINE PLACE ROOM 1404
5203 LEESBURG PIKE
FALLS CHURCH, VIRGINIA 22041-3466

FORCE MANAGEMENT
AND PERSONNEL

2 DEC 1986

Dear QC Program Coordinator,

The Office of the Assistant Secretary of Defense (Force Management and Personnel), has requested that the Navy Personnel Research and Development Center (NPRDC) conduct a study assessing the effectiveness of quality circles (QCs) within the Department of Defense (DoD). The purposes of the NPRDC study are (1) to provide guidelines for directing future QC programs within DoD; (2) to identify differentiating characteristics of QC programs in DoD; and (3) to assess the effectiveness of the various programs.

NPRDC is conducting the research in two phases. Phase I of the project consists of gathering general QC program information from the various project coordinators throughout DoD. They have already met informally with some of the Quality Circle Program Coordinators. The second phase, which is logically dependent on the first, consists of the administration of questionnaires to randomly selected activities with Quality Circle Programs. Quality Circle Program Coordinators will be asked to distribute three different questionnaires: for QC facilitators, for QC members, and for managers of employees who are members of QCs. The questionnaires will take approximately 30 minutes to complete and will be returned directly to NPRDC.

In approximately 3 weeks NPRDC will send you a package consisting of the questionnaires, self-addressed stamped envelopes, and detailed instructions for distributing the questionnaires. Michael White and Paula Konoske are the principal researchers (NPRDC) for this study and can be reached at AV 933-2191 (6935).

Your cooperation is requested during the conduct of this important DoD effort.

Sincerely yours,

RICHARD J. POWER
Director
Defense Productivity
Program Office

APPENDIX G

SCALE RELIABILITIES AND DESCRIPTIONS

SCALE DESCRIPTIONS AND RELIABILITY COEFFICIENTS FROM QUALITY CIRCLE MEMBER QUESTIONNAIRES

Scales Developed from Member Questionnaires:

1. **Scale 1: Do Workers Want To Participate?**

   7a. I thought QCs might solve some problems and make my job easier
   7b. I wanted a chance to solve a work-related problem
   7c. I wanted to get the training in problem-solving techniques
   7j. I wanted a chance to express my ideas

   Reliability coefficient: $\alpha = .63$

2. **Scale 2: Management Interested in Worker Participation**

   31d. Lack of our command support
   31i. Not enough facilitators for our QC
   31l. My management is not supportive
   31q. Lack of support from headquarters
   36a-h. Show the extent to which your management has supported the QC program with each of the following resources.

   a. Money, b. training, c. facilitators, d. members' time, e. recognition, f. personnel development, g. solution implementation, and h. verbal support.

   Reliability coefficient: $\alpha = .87$

3. **Scale 3: Labor Unions Supportive**

   37. To what extent has your union supported the QC program?

4. **Scale 4: Organizational Trust and Stability**

   26. To what extent does your organization operate in an uncertain (don't know what will happen next) environment?

   27. How would you describe your organization as a whole? (Very friendly atmosphere to very unfriendly atmosphere)

   31p. Lack of job security for our QC members

   31z. Lack of trust in supervisor-subordinate relationships

   Reliability coefficient: $\alpha = .63$

5. **Scale 5: Training Adequate**

8. To what extent have your received adequate training in the following areas: problem-solving techniques, QC tools, training in purposes of QC, training for how to make presentations, training for tracking and determining cost savings of QC suggestions.

31j. My fellow QC members don't know enough to solve problems
31r. Lack of QC member training for my group

Reliability coefficient: $\alpha = .92$

6. Scale 6: QCs Meet Regularly

6. How long has it been since your last QC meeting?

7. Scale 7: QCs have Sufficient Information

20. When working on problems out of your work area, are the information and/or people you need available to solve the problems?

8. Scale 8: Problems at Shop Level

12. Problems solved at worker level
31k. Problems are not at our QC level
31v. Problems involved more than just my own work group

Reliability coefficient: $\alpha = .5537$

9. Scale 9: Management Did Not Implement QC Ideas

28. Would you say that management in your organization is flexible when it comes to trying new things?

29. Describe your supervisor's management style when dealing with you. (Scale ranged from very participative to very directive)

30. In general, how well does management in your organization respond to ideas from the workforce?

31b. Management did not implement my QC's ideas

Reliability coefficient: $\alpha = .80$

10. Scale 10: Cost Savings Shown

31e. No signs of dollar savings from our QC
31o. No signs of improvement to convince management to keep QCs

Reliability coefficient: $\alpha = .54$

11. Scale 11: Key QC People Stay

31c. My QC leader lost interest
31f. Turnover in top management
31g. Turnover in key personnel in the QC program
31w. No "champion" for QC program

Reliability coefficient: $\alpha = .58$

12. Scale 12: QC Effectiveness

13a. Greater productivity
13b. Improved product or service quality
13c. Improved processes or procedures
13d. Improved worker satisfaction
13e. Improved communication up the chain
13f. Reduced turnover or absenteeism
13g. Increased involvement by the workforce
13h. Improved employee analytical skills
13i. Greater employee participation in decision making
13j. Improved employee trust in management

Reliability coefficient: $\alpha = .94$

Scales Developed From Supervisor Questionnaires:

13. Scale 13: Management Concerned Over Infringement of Power

S21. How participative are you when interacting with subordinates?
S22. How participative is your supervisor when interpreting with you?
S23. How well does management respond to ideas from work force?
S30. How friendly would you describe your organization as a whole?
S31. Management is flexible when trying new things

Reliability coefficient: $\alpha = .72$

14. Scale 14: Management QC Training Adequate

S10C. Adequate training in purpose of QC
S11C. Adequate training in management responsibilities in QC

Reliability coefficient: $\alpha = .86$

15. Scale 15: QCs Meet Regularly

S29N. Not able to let QC members go to meetings
S29T. The job limits attending QC regular meetings

Reliability coefficient: $\alpha = .78$

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